# LIPOPROTEIN CHANGES IN HIGH RISK PREGNANCIES AND THEIR PUERPERIUM

## THESIS
## FOR
## DOCTOR OF MEDICINE
## ( INTERNAL MEDICINE )



## BUNDELKHAND UNIVERSITY
## JHANSI (U.P.)



1998

Rakesh Kumar Srivastava

## CERTIFICATE

This is to certify that the work entitled "LIPOPROTEIN CHANGES IN HIGH RISK PREGNANCIES AND THEIR PUERPERIUM"has been caried out by **Dr. RAKESH KUMAR SRIVASTAVA** in the Department of Medicine, M.L.B Medical College Jhansi.

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# CONTENTS

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DATED: 19/6/98.

{Rakesh Kumar Srivastava}

# INTRODUCTION

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Various studies have been done about the hormonal changes brought about by pregnancy but still pregnancy is a metabolic curosity . However it brings significant changes in metabolic process. It is known that high concentration of many of the sex steroids occur as nomal pregnancy advances and since cholestrol is the precursor of most of these steroids , part played by lipid metabolism in pregnancy becomes more and more intriguing.

It has been observed that increase in serum total cholestrol and serum triglycerides occur steadily till term and then falls abruptly after delivery (Boyd , 1934 ; Dieckmann & Wegner , 1934 ; Waston 1957 ) . This was also corborated by studies previously done in our department (Arora and Indu , 1985 , Arora and Vinita , 1986). This denotes that placenta is the principal organ responsible for the elevated serum total cholestrol (STC) and serum Triglyceride (STG) during pregnancy . The incidence of atherosclerosis is less in Indian women even in repeated pregnancies , where the cholestrol level is elevated . this is probably because the elevated Oestrogen might be preventing the deposition of cholestrol in the intima of arteries and veins (Chaturvedi et al , 1978). These metabolic changes are rather exaggerated in Toxaemia of pregnancy ( a syndrome complex characterise by hypertension to the extent of 140 mm hg or more with oedema or proteinuria or both induced by pregnancy usually after 20$^{th}$ week of gestation . The toxaemia of pregnancy is an inadequate term which still frequently used to cover a condition peculiar to pregnancy whose actiology is unknown but was formerly attributed to the action of a hypothetical toxin since it is no longer believed that this disorder is caused by toxin , a better term in pre-eclampsia and is accompanied by fetal and maternal hypercholestralaemia (Indu Bala , 1983 , lall and Sinha , 1983) Ghosh reported that the value of total cholestrol rises significantly in pre-eclamptic patients . Brat Vold and De Averez (1961) noted some increase in serum total cholestrol in pre-eclampsia as compared with values in normal pregnancy . the difference however was not thought to be significant . On the contrary Arsoba and Kretowicz (1963) reported that such difference was statistically significant . the serum cholestrol level falls gradually in the post partum period both in toxaemia and in normal pregnancy. However in toxaemia cases such levels do not return to normal as quickly as it does in the cases of normal pregnancy . (Lall and Sinha).

Cholestrol is necessary for cell division so it is important for synthesis of structural component of foetus and elevation of all lipid plasma carrier during pregnancy correlates well with the increase in

the fetal caloric demand . Triglycerides and fatty acids are directly transported from the mother to foetus in early pregnancy but probably are synthesized in foetus later in pregnancy . cholestrol is capable of direct transfer from mother to the foetus. Placental production of progestron can be estimated which is important for maintenance of pregnancy and also as the pre cursor for placental progesterone biosynthesis is maternal low density lipoprotein (LDL) cholestrol (Simpson & associates ; 1954 , Hellig & associates 1970 ; Casey , 1992) so by estimating maternal LDL .

The implantation of the conceptus , the support of embroynic development and continuation of prgnancy depends on a complex interaction and hormonal effects on hypothalemic , pituary uterine ovarian axis . Among the sex hormones important are oestrogen , progestron , human placental lactogen and human chronic Gonadotrophin . During normal pregnancy plasma progestrone increases to about 25 ngm/ml 9 weeks after ovulation and remain relatively constant until about 10 weeks of gestation when placental secretions taken over . Plasma level of progestron rises rapidly from 28$^{th}$ week onwards and reaches to approximately 180 nmg/ml with the level being relatively constant during the last 4-6 weeks of gestation . Similarly oestrogen concentration also increases till term (Kloppler and Billiwicz , 1963 ; Beisher et al , 1969) urinary oestrial level also rises progressively during pregnancy from 5.5 g mg / 24 hr at 20 weecxdsew3k to about 33 mg / 24 hrs at term and if the level is less than 12 mg /24 hrs. during later months , it suggests serious foetal compromise in utero . It has also been shown from various studies that in 50% cases showing sustained low level of oestrogen there is evidence of growth retardation .and also as the precursor for placental progesteron is maternal LDL .c (Simpson & Associats,1954,Hellig & Associates 1970,Casey 1992) So by estimating maternal LDL plancetal production of progesterone can be estimated which is important for maintenance of pregnancy Intra uterine growth and it's aberrations are major concern of modern abstetrics because birth weight is the strongest indicator of perinatal mortality.

The birth weight depends upon both the gestational age and foetal growth . Although perinatal mortality is an outcome variable that is both clinically relevant and readily ascertainable , the morbidity associated with intra utrine growth retardation (IUGR) is also significant (Koops and associates , 1982).

The term intra utrine growth retardation is designated to indicate the fetus with birth weight less than 10$^{th}$ percentile or below 2 standard deviation of the mean for that period of gestational age . There are many factors associated with intra uterine growth retardation . Apart from fetal causes like chromosomal

abnormalities , congential malformations , fetal infections and placental abnormalities , maternal causes are also very important . Among various maternal causes , important are maternal vascular diseases like pregnancy induced hypertension , chronic hypertension and advanced diabetes Mellitus , nutrition besides environment & Haematological causes.

Although studies have been done on lipid lipoproteins profile in female sof various age groups and their relationship with different hormones , little attention has been given to its relationship with pregnancies complicated by toxaemia and intrautrine growth retardation

Before studying the changes in lipoprotein profile it is necessary to have some background knowledge about lipoprotein . Lipoproteins are of mainly five types - High density lipoprotein (HDL) , Low density lipoprotein (LDL) , very low density lipoprotein (VLDL) , serum triglycerides (STG) and total serum cholestrol (STC) . Lipids remain in plasma in complex form other than chylomicrons . Triglyceride transport is the major recognised function of serum lipoproteins . VLDL tells the function rate of hepatic triglyceride synthesis which in turn depends upon :-

- Rate of free fatty acid uptake from blood
- Fatty acid synthesis from glucose
- Extent of fatty acid oxidation
- Conversion of fattuy acid to triglycerides.

VLDL transports triglycerides to muscle and other tissue as a source of energy . Ingestion of glucose decreases VLDL whereas increased level of VLDL has been related with obesity , high carbohydrate or low fat diet , ingestion of food in need and diminished level of HDL and LDL.

LDL is mainly derived from breakdown of VLDL in the circulation . LDL is increased by fat saturated fatty acids and cholestrol . function is uncertain.

HDL is synthesized in the liver . HDL lipid serve as major substrate for lecithin cholestrol acyl transferase . HDL also function to transport cholestrol from peripheral tissues to the liver
. So with all these informations we decided to study the changes in lipoprotein profile in pregnancies complicated by PIH( pre-eclampsia and eclampsia ) and IUGR during their antepartum,intrapartum and postpartum period in a group of females from Bundelkhand region.

# AIMS & OBJECTIVES

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- To know the trend of changes in various lipoprotein fractions during ante partum period that is I and III trimeters of pregnancies complicated by toxaemia , eclampsia and intra uterine growth retardation (IUGR).

- To know the changes in lipoprotein profile brought about by labour in toxaemia , eclampsia and IUGR.

- To ascertain the trend of changes in levels of lipoproteins fraction brought about by immediate , early and late puerperium i.e. 24 hrs of post partum , 7 days post partum and 1 month post partum in pre-eclampsia , eclampsia and IUGR.

- To ascertain the effect of parity over the levels and trend of changes in various lipoproteins fractions in the pre-eclampsia & eclampsia.

- To compare the changes in various lipoprotein fractions in pre-eclampsia , eclampsia with good foetal outcome and bad foetal outcome.

- To compare changes in lipoprotein profile in pre-eclampsia eclampsia and intra utrine growth retardation during their antepartum , intra partum and post partum period.

# REVIEW OF LITERATURE

# *REVIEW OF LITERATURE*

## LIPID PROFILE DURING NORMAL PREGNANCY

It has been known for years that an increase in circulating lipids occurs during pregnancy . Even though cholestrol and other lipids have been the centre of considerable lay interest and also the subject of much scientific investigations relatively few reports have dealt with serial studies of lipids during pregnancy.

Based upon virtually no information , Becquerel and Rodier[1] . In 1845 suggested that hyperlipaemia occured during pregnancy . They hypothesized that this change represented an increase in blood cholestrol as well as increase in lipid phosphorous during pregnancy. Two years later Vershow[2] (1847) showed that the milky appearance of sera of some pregnant women was due to the presence of fat . The first clinical study was undertaken by Chauffard and Associates[3] . In 1911 who demonstrated an increase in blood blood cholestrol during pregnancy . In the same year Neumann & Herrmann[4] studied the lipid particle in the whole blood and reported increase in cholestrol during pregnancy.

The development of micro methods made it possible to study blood lipids partitions accurately . It was not until 1934 when Boyd[5] showed that the principle cause for the widely divrgent results reported before that time was found to be the fact taht some investigators were reporting determination performed on whole blood while other reports were based upon investigations of plasma and serum specimen Dickmann's[6] 1934 report dealt only with plasma cholestrol . Boyd found that almost no change occured in lipid content of RBG during prgnancy , however striking changes were noted in the plasma lipids.

Different investigators have reported increased serum cholestrol level at different periods of gestation . Herrmann & Neumann (1972) analysed the serum of pregnant women and concluded that during first 6-7- months , serum cholestrol might be increasd and that during the last two months an increase was the rule . Plass & Temkins[7] (1923) also have given rising figures of cholestrol during pregnancy from 4th month till term . Tyler & Underhill[8] 1929 determined that cholestrol and cholestrol ester increases gradually till term.

Gardner and Gainsborough[9,10] (1929) reported that free cholestrol increases during pregnancy to the 30th week with a decrease in ester cholestrol to about the same time Bugnard[11], Columbus and gwilheim . Hinglais and Coverto (1940) found an increase in total cholestrol in later months of pregnancy.

Dickmann & Wagner[12] (1934) found the total cholestrol to increase to 23% above the first trimeter level , which decreases to 27% at eighth post -partum week from the values noted at term . This rise noted by Dickmann is considerably lower than De-Alvarez[13] et al (1959) findings of 54% increase in third trimeter for total cholestrol and a 23% decrease in the values 6-7 weeks post partum for total cholestrol and as compared to the 3rd trimeter values. Oliver and Boyd[14] (1955) after careful study of 12 normal primigravida stated that between 31st and 33rd week of pregnancy , there was a highly significant rise in plasma ester and total cholestrol . By the 20th week post partum these values decreased considerably but were all higher than the level at 12th week of pregnancy.

Mc. Eachern and Gilmour determined whole blood cholestrol in 12 pregnant women and concluded that marked elevation was found in about 30% of normal pregnant women beginning about 6th week prior to delivery and that about 80% had a level above normal on the first day after delivery. the figures were still higher on the 12th post partum day . Later on this increase in total serum cholestrol during pregnancy was also proved by Mullickand Bagga[15] (1964) , Konttinen[16] et al (1964) , Maria R . Waith et al (1975) , Kalkhoff[17] (1978) , Darmandy[18] et al 1982 .

Salamesh and Mastrogiannis (1994) observed that plasma lipid lipoprotein undergo both qualitative and quantitative changes during pregnancy there is a gradual two to three tfold increase in triglyceride level and they reach their peak 1200 mg/dl to 3000 mg / dl . St term & gradually falls thereafter by 36 week of gestation , VLDL and other lipoprotein particles increase their triglyceride content proportionately to each other and to increase in serum triglyceride total cholestrol level at term, changes less dramatically with only a 50-6 changes in plasma lipid and lipoproteins during pregnancy are thought to b adaptive . The rise in plasma triglyceride provide maternal fuel saving the glucose for factor . The rise in 2 DL-C appears to be necessary for placental steriodogenesis . Hypocholestrolemia caused by hypo betalipoprotein leads to decrease levels of estrogen and progestrone in affected pregnant women.

## Hormones in pregnancy and their role in maintenance of pregnancy

1. Oestrogen - oestrial is the main preganncy oestrogen which accounts for 80-90% of oestrogen formed in late pregnancy.

in classic experiment Ryan[19] (1959) found that there is an exceptionally high capacity of placenta to convert certain C19 - steroids to oestrogen . The first proof that placenta uses plasma borne precursors as substrates for oestrogen biosynthesis shown by Baulieu and Bray (1963); Siiteri and Mac Donald[20] (1963)

Effects of oestrogen on lipid profile

Eilbert (1949) found that oestrogen administration to women evoked an increase in the plasma total lipids . Russ and Associates[21] (1955) found that the administration of estrogen lowered the beta lipoproteins but raised the alpha lipoprotein Devi & Sharma[22] (1972) , Gupta (1976) . Wallace[23] et al (1979) observed that total cholestrol LDL and VLDL all have been elevated in women using oral contraceptives.

As the hormones like oestrogen and progestrone are important for continuation of pregnancy . It has been shown that outcome can be predicted by the subsequent rise in pregnanedial output as pregnancy progressed (Machanghten and Michie , 1960).

In other study by Klopper & Billiwitz (1963) they have estimated oestrial excretion in successful pregnancy and habitual abortion and shown that oestrial output in successful pregnancy approximates closely to normal values which that of abortion fill week by week until 10 weeks it was less than 40% of normal[24]

Progestrone -

After the first weeks of gestation very little of progestrone produced arises in the ovary (Diczfatury and Troen[25] , 1961) . Daily production rate of progestrone in late normal singleton pregnancy is about 250 mg (Pearlman[26] , 1957) . Progestrone levels in maternal peripheral plasma increases progressively with gestation.

Workers (1957) , Simpson and Colleagues (1954) found that perfusion of placenta in vitro with radiolabelled cholestrol resulted in formation of radiolabelled progestrone[27].

Hellig and associates (1970) also found that maternal plasma cholestrol was the principal precursor (upto 90% ) of progestrone biosynthesis in human pregnancy[28]

Simpson and associates demonstarted that trophoblast preferentially uses how density lipoprotein cholestrolfor progestrone biosynthesis . This subject was reviewed recently by casey and Colleagues[29] (1992)

Effect of progestrone on lipid profile -

Corredor et al (1970) found significant rise in triglyceride levels afetr 6-12 months use of oral pills . Barton in 1970 found significant rise in serum triglyceride levels in females using combined pills but there was no change seen with progestin only pills[30].

Spellacy (1976) observed the effect of nongestrel on carbohydrate and lipid metabolism there was no significant change in serum cholestrol levels.

Lauritzen in 1977 observed a decreasing effect of norethisterone on cholestrol and triglyceride levels of beta lipoprotein[31] . He also suggested that there is no influence of hydroxy progesterone on cholestrol level.Bradley et al (1978) found that progestins derived from 17 alpha hydroxy progesterone and others are relatively inert , while those derived from 19 . Nor testosterone (levonorgestrol , norethisterone acetate and others ) decreases high density lipoproteins.

Krauss et al (1983) observed effects of two different progestrone pills and found that VLDL increased with only norgestrel . LDL was significantly lower in nor ethisterone group results were variable with very low density lipoproteins.

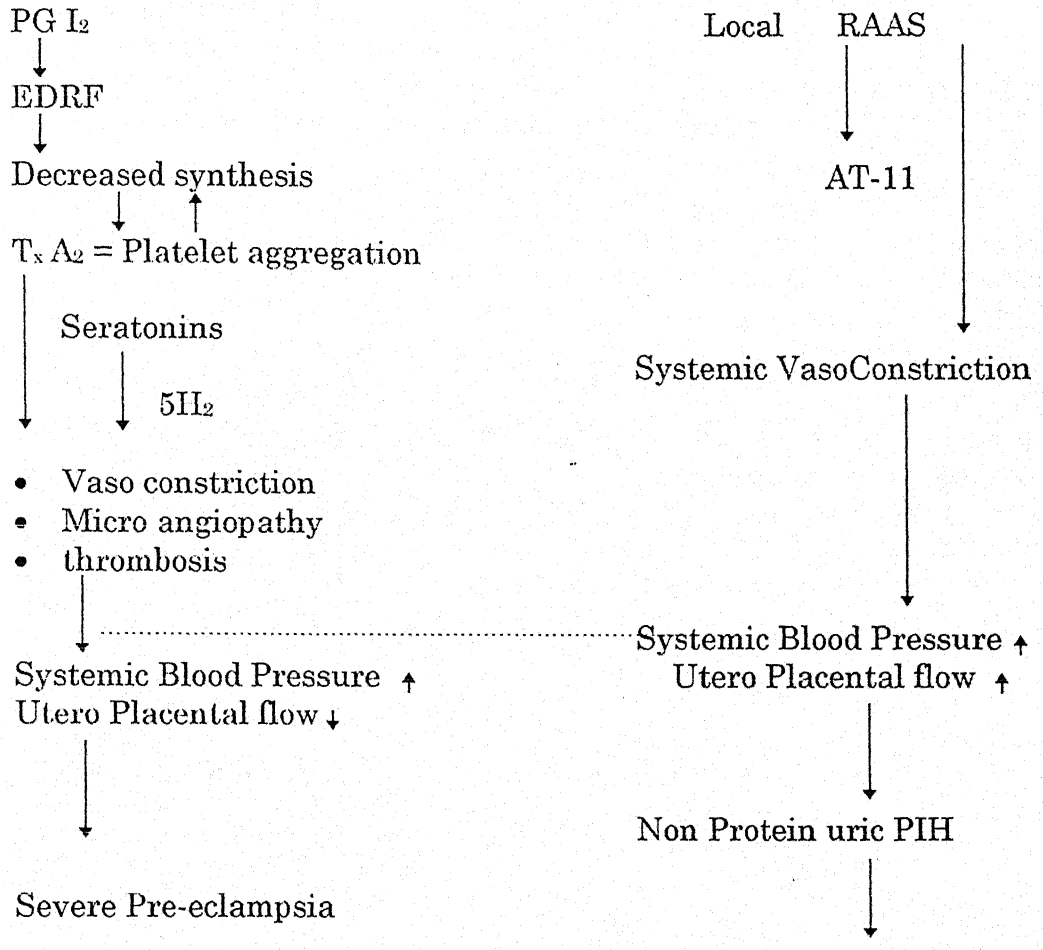
**Lipoprotein in Toxaemic Mothers** :-

The serum total cholesterol estimation was under taken in 1911 by Chauffrd and Associates[32] in three eclampsia patients and normal pregnant women . They reported an increase in the blood cholesterol during pregnancy but found no consistent variation in eclampsia mothers as compared to that of the conc. in the serum of healthy Gravidac a similar conclusion was made by several other investigators (Aunyenreith & Runk ; 1913 , Burgert Prener ; 1913 ; Schlimpert and Huffman , 1913 ; Huffmann 1955 ; Slemon's & curtier , 1917 and Dickmann & Wegnar[33] 1934)

Boyd in 1935[34] reported plasma lipid in eclamptic mother . He observed mean value of total lipid to be 829 $\pm$ 255 mg/dl . In eclampsia and 785 $\pm$ 117 mg /dl in normal pregnancy. the mean cholesterol level was observed to be 187 $\pm$ 56 mg / dl and 179 $\pm$ 35 mg / dl respectively

## The pathogenesis of pre-eclampsia :

Endothelial dysfunction -




**Patho physiological mechanism in mild and severe Pre-eclampsia**

(Zeenam and Dekke , 1992)

5 HT = 5 Hydroxy trypitamine
AT 11 = Angiotensin-II
PG I = Prostaglan din $I_2$
EDRF = Endothelium derived relaxing factor

$T_x A_2$ = Thromboxque $A_2$
RAAS =Renin angiotensin aldosterone system

Neutral fat value were 219 ± 210 mg /dl and 248 ± 63 mg /dl , phospholipids were 361 ± 102 mg /dl and 293 ± 52 mg / dl in eclampsia and normal subjects relatively . However the ratio of phospholipid and cholesterol was found to be significantly higher in eclamptic patients than in other toxic or normal pregnancy.

Calvin et al (1939) found the initial cholesterol value of Toxaemic mother at third month to be 21 mg / dl which gradually rise in a fluctuating manner to 233 mg / dl in the 7th month then dropped sharpely to 194 mg /dl in 8th month and 176 mg /dl in 9th month . During the time of pregnancy the basic metabolism was rising sharpely in Toxaemic subjects .

Langer Crantz (1945) , Macy (1951) and Dickmann (1952) observed an increase in both serum protein and serum lipid in Toxaemia . Smith eta l (1959) observed that cholesterol and lipid phosphorous increase as pregnancy progresses reaching their maximum at term. The percentage of lipoprotein showed a decline with progress of pregnancy specially during 3rd trimester.

De Alverz and Bratvold[35] (1961) studied total lipid in 7 normal pregnant women . the average mean value for total lipid during the last four weeks of normal pregnancy was 974 ± 154 mg / dl . The mean value for mild pre-eclampsia was significantly elevated [ p.002] above the average value for normal pregnant women in third trimester . The women of severe Toxaemia were having total lipids almost 200 mg / dl above the mean level of normal pregnant level .

Arsoba and Kretowicz (1963) reported elevation in serum cholesterol , phospholipids and total lipid toxaemia of pregnancy.

Nelson[36] et al (1966) observed triglyceride content of placenta . In toxaemia simply reflect that placenta is disease organ in toxaemia and found raised level of both maternal & Foetal Phospholipids and triglycerides as compared with controls . However the elevation was not statistically significant.

Mullick & Bagga (1964) found a gradual increase in Beta- lipo - proteins and alpha lipoproteins ratio as pregnancy advances . Bhattachrya[37] et al (1969) concluded after their extensive study over normal & abnormal pregnancy that although cholesterol levels were slightly higher in toxaemia group , the cholesterol metabolism seemed to be similar in normal toxaemia of pregnancy.

In 1978 Chaturvedi , Tandon and Singh[38] observed that in toxaemia of pregnancy there was significant rise in total serum cholesterol as compared to the IIIrd trimester of normal pregnancy .

They also observed that in toxaemia serum cholesterol level did not return to same level as it did in the normal; pregnancy in post partum period and this was statistically significant . The level cholesterol had no significant relationship with the degree of hypertension in ante partum period .Mullick & Bugga[39] (1964) found a gradual increase in beta lipoproteins and beta and alfa lipoprotein ratio increases as pregnancy advances.

Warren[40] et al 1962 observed greatest increase in triglyceride followed by phospholipids and finally cholesterol in a pregnant female .

Pregnancy is associated with significant increase in VLDL and LDL conc. HDL2 generally shows a slight decrease whereas HDL3 is markedly increased leading to a significant increase in total HDL . Studies of Oliver and Boyd[41] showed that beta/alfa ratio is even graeter than the uncomplicated pregnancy . Increased HDL3 and decreased HDL2 are still demonstarble 6-9 months post partum and the beta / alpha ratio remains 4 : 1 five months post partum perio (HDL2 - Chol . page 325) Worth , Arky & Knopp . In 1975 reported a consistent increase in LDL:HDL lipoprotein ratios quantitatively greater increase in beta than in alpha function . They stated that triglyceride rises more than cholesterol and phospholipids and HDL cholesterol is not significantly reduced.

Pontis[42] et al (1978) observed diminished percentage concentration of alpha lipoprotein with a concomitant elevation of percentage of beta lipoprotein at the first stage of labour and in Puerperium alterations towards normal non pregnant levels.

Ronald K . Kalkhoff (1978) stated that the hyper triglyceridemia of late pregnancy is mainly due to increase in VLDL concentration , constituents are proportional; and cholesterol , triglyceride and phospholipids are unchanged . Hyper triglyceridemia also due to increase in HDL and LDL in which triglyceride is reliably more . They also stated that Oestrogen is principle hormonal factor responsible for increased synthesis and release of endogenous triglyceride.

Knopp[43] et al 91981) stated that progressive hypertriglyceridemia of pregnancy is due to rise in VLDL triglyceride of particular interest was their finding of biphasic pattern in HDL cholesterol conc. with a peak in midgestation and then a subsequent decline towards non pregnant levels at term .

Dermandy[44] et al (1982) concluded that the primary changes in lipoprotein metabolism during pregnancy appears to be concerned with VLDL they observed pronounced elevation of VLDL conc. In

ultra centrifugal analysis of serum from pregnant women in 3rd trimester , compared with that from non pregnant women. After delivery the elevated serum triglyceride conc. decreases rapidly and the significantly greater utilization of serum triglyceide in lactating women could be caused by the tissue specified direction of VLDL towards the mammary glands for milk synthesis.

**Lipoprotein in IUGR (Intrauterine growth retardation)**

In 1961 Warkany and co-workers[45] reported normal values for infant weights lengths & head circumferences and defined fetal growth retardation . In 1962 , WHO introduced the term low birth weight for all babies weighing less than 2.5 kg as a single category.

Gruenwald[46] (1963) reported that approximately one third of low birth weight infants were mature and their small size could be explained by chronic fetal distress probably due to placental insufficiency.

In 1963 Lubchenco & co-workers[47] from Denner published detailed comparison of gestational age to birth weights in an effort to derive norms for expected fetal size and therfore , growth at a given gestational week.

Battaglia and Zubchenco (1967) then classified small for gestational age (SGA) infants as those weighing below 10th percentile for their gestational age.

Kramer[48] (1987) reviewed 895 studies on fetal growth in english and french languages published between 1970 and 1984 and concluded that there was great confusion and controversy despite the profuse no. of studies . Problems with growth retarded fetuses - Wennergren and co-workers (1988) the neonatal performance of 160 infants defined to be growth retarded because their birth weight was a t or two standard deviation from the mean . In most cases 831 growth retardation has been suspected antenatally by birth weight less than 2 standard deviation of the mean for that period of gestation . hypoglycemia & Hypothermia occured frequently . The major hazard of growth retardation were still birth and fetal distress . Similar observations have been made by Villar & Colleagues (1990)[49] for growth retardation at term and by Vesser & associates 1986) between 25 and 34 weeks.

Autopsy findings in small for gestational age (SGA) infants have revealed two basic pattern of impaired fetal growth (Gruenwald , 1963 , Naye and Kelly, 966) one was designated as symmetrical growth retardation because all body organs tend sto be

proportionately reduced in size and assymetrical when some body organs are more affected than others.

Factors regulating fetal growth are mainly genetic and racial . Neonates of Indian and Chinese weigh less than those of Europeans of Africans (Ashcroft and Desai[50] , 1976) . Foetal growth is also influenced by the maternal weight , height , age , parity and duration of gestation . Social deprivation influences height & shorter women are not optimal reproduce as far as support of fetal growth is concerned (Gruenwald , 1968) .

Maternal & placenatl causes are also important . Hypertension during pregnancy causes IUGR . It varies with mean arrterial pressure at 4-6 months higher it is lower the birth weight (Page and Christiansons( 1976).

Boyd & Scott[51] (1958) showed that compared to normal placenta in pre-eclampsia and IUGR were of a lower volume of Parenchyma and Villious surface with increased area of infarction.

Poor maternal nutritional status also affects fetal growth . Pregnancy weight of 40 kg or below , poor weight gain in pregnancy (less than six kg) , anaemia (Hb less than 8 gm / dl ) and mid arm circumference 9less than 20 cms ) were associated with low birth weight babies (Jayam et al , 1984 ) . Acute starvation restricts fetal growth with birth weight of 300-400 gm due to loss of body fat (Hytten , 1979) with nutritional supplemenyts ( Calories , protein , Iron < Folic acid ) in the 2nd half of pregnancy there is fetal Odycst gain of over 200 gm , compared with controls . (Ven katachalam , 1962 , Iyengar & Rajalakshmi , 1974 ; lachting et al , 1975)[52,53]

Biale[54] (1983) studied lipolytic activity in the placenta of chronically deprived featuers , concluded that lipoprotein lipase activity was significantly greater in placentas of pre-eclamptic women and in placenta of intra uterine growth retarded features.

Iwaszkiewicz , Pawlowska[55] (1986) found that pregnancy complicated by intra utrine growth retardation , the free fatty acids concentration in amniotic fluid was almost three times higher than in normal pregnancy.

In 1980 Economide & Crook[56] showed that small for gestationalage fetuses had hyper triglyceridemia and hypo glycemia and hypoinsulinemia.

Recently Berg , Ronald , Sande[57] (1994) found that high lipoprotein (9) [ Lp (9) ] level in maternal serum can interfere with placental circulation and causes fetal growth retardation.

# MATERIAL & METHODS

# *MATERIAL & METHOD*

The present study was carried out in the Department of Medicine and department of obstetrics and gynaecology, MLB, Medical college Jhansi , over a period of one year starting from March 97 to March 98.

SELECTION OF CASES :-

The study comprised of patients attending outdoor clinic of the department of obstetrics and Gynaecology for Ante natal examination , Antenatal wards , Eclampsia room and from labour room directly. The pts studied were broadly divided into following groups :-

Group A - Pre eclamptic toxaemia group

Group B - Eclampsia group

Group C - Pts with Intra uterine growth retardation (IUGR Group)

PRE - ECLAMPTIC PATIENTS

Were taken to be those who developed hypertension after 20th week of gestation with the following associated conditions .

a) Proteinuria and or
b) Oedema or
c) Both a & b

HYPERTENSION -

An absolute rise in B.P. of at least 140 / 90 mm Hg, if the previous B.P. is not known or a rise in systolic pressure of at least 30 mm Hg or a rise in diastolic pressure of at least 15 mm Hg over the previously known B.P. is being considered as criteria for Toxaemic hypertension . The B.P. cited must manifest on atleast two occasions 6 hrs. or more apart.

PROTEINURIA :-

It is defined as more than 0.3 gm/lt in 24 hrs. collection or greater than 1 gm/lt in at least two random urine specimens collected 6 hrs or more apart.

OEDEMA :-

Demonstration of pitting Oedema over the ankles after 12 hrs bed rest or rapid gain in weight more than 5 pounds a month in later month.

Eclamptic pts. were taken to be those who developed convulsions and / or coma , not caused by any coincidental neurologic disease such as epilepsy and fullfilled all the conditions set fourth for pre- eclamptic patients as taken above.

PATIENTS WITH INTRA UTERINE GROWTH RETARDATION :-

(IUGR Group) ⇒ This group included pregnant woman who had on clinical evaluation the fundal height of uterus being less by at least four weeks from the expected period of Gestation (on the basis of LMP) and later confirmed by ultra sonography.

Total no. of cases studied were 50 , 13 cases did not return at different stages of follow - up so 13 cases were excluded from the study , so total number of cases were 37 , out of which 10 cases were of pre eclampsia ,
17 cases were of eclampsia and 10 cases were of (I.U.G.R.).

CLINICAL EXAMINATION :-

Acomplete clinical history of the above cases regarding age , parity , socio-economic status , literacy level , history of present pregnancy , past history , obstetrical history , menstrual history , family history , dietary history was taken as described in format . It was ensured that pt did not suffer from any other disease which caused increased cholestrol level such as coronary heart disease , renal disease , liver disease and diabetes mellitus. Complete general and systemic examination was done with special emphasis on - general built , pallor , height and weight , blood pressure and to rule out other disease which can cause altered lipid profile. The pts. were examined and investigated in detail to detect Toxaemia of pregnancy . Most of the pts. in eclampia group were in the last trimerter of pregnancy nearing term . Fundal height was assessed and the period of Gestation was determined and it was ascertained if this corresponds to period of amenorrhoea as told by the pt. Per vaginal examination was done specially in pts. having labour pains to ascertain whether she was in labour or not , so that blood sample could be taken at appropriate time. Patients who were diagnosed as having pre eclampsia or I.U.G.R. in II$^{nd}$ trimeter were called again for regular follow up in the subsequent trimeter of pregnancy to ensure best possible out come of those pregnancies.

Investigations:

Following investigations were performed.

I. Routine : - Haemoglobin , TLC , DLC , ESR , GB.P.
Blood group
Blood sugar
Blood urea

Blood urea , S. Creatinine , S. uricacid , liver function tests were specially done in cases of pre eclampsia and eclampsia.

Urine : - ( albumin ) Protein (quantitative by Esbach method )
Sugar
Microscopic

II. Lipoprotein profile :-

Serum total cholestrol
Low density lipoprotein
Very low density lipoprotein
High density lipoprotein
Serum triglyceride.

III. For I.U.G.R. Group specially

V D R L
T O R C H infection
Ultra sonography

Period of collection of blood samples :-

1. Antenatal period
   a) One sample from 13th to 28th week (In pre eclampsia IUGR Group)
   b) One sample from 28th week to 40th week.

2. During labour

3. Within 24 hrs. of parturition

4. After one week of delivery

5. At 30th day after delivery

METHOD OF COLLECTION OF BLOOD SAMPLES :-

- 5 ml of blood was withdrawn from the patients having fasted for 12-14 hrs. (wherever it was possible) without any venous stasis in recumbent posture with full aseptic precaution.
- After withdrawing the sample , it was allowed to settle , facilitating the serum to separate , then centrifuged and serum was preserved with standard precautions.

ESTIMATION OF LIPID FACTORS :-

Various lipid factors - Serum Total Cholestrol (STC) , Serum triglyceride (STG) , High density lipoprotein (HDL) were estimated with standard diagnostic kits while low density lipoprotein (LDL) and very low density lipoprotein (VLDL) were derived from values of above mentioned lipids by formulae.

1) Serum Total Cholestrol :- STC was estimated by Wyenbenga and Pileggi (1970) method utilising commercial kit supplied by ETHNOR . The basic principle is that Chalerlerel reacts with test solution of ferric Perchlorate , ethyl acetate and sulphuric acid and gives a lavender coloured complex which is measured calorimetrically

2) Serum Triglyceride (STG) :- It was estimated by acetyl acetone method . Principle behind is that Triglycerides are determined by measuring glyceral aftre it's liberation from fatty acid by saponification . Glycerol is oxidised by sodium meta periodate to formaldehyde which is directly proportional to the amount of triglycerides.

3) High density lipoprotein :- HDL was estimated by commercial kits supplied by ETHNOR . Basic principle is that the HDL cholestrol fraction is seperated by using a precipitating reagent . The precipitate contains chylomicrons , VLDL , LDL which are removed by centrifugation . the supernatant contains HDL cholestrol which is estimated by HDL-C color reagent which gives purple coloured complex which is measured calorimetrically at 560 nm (560 - 600 nm) . The intensity of color developed is proportional to the concentration of HDL-C in the specimen under test.

4) Very low density lipoprotein :- It was calculated by formula given by Friedwald et al (1972) . This formula is valid upto STG values less than 400 mg %.

5) Low density lipoprotein :- It was calculated by formula given by Fredrickson D.A. (1972)

$$\text{LDL (mg / dl)} = \text{STC} - (\text{STG}/5 + \text{HDL})$$

or

$$\text{LDL (mg / dl)} = \text{STC} - (\text{VLDL} + \text{HDL})$$

# OBSERVATIONS

## Statistical Ananlysis

"t" Value was calculated by -

1. For comparison in the same group -

$$t = \frac{\bar{d}}{S(\bar{d}) / \sqrt{n}} \qquad S(d) = \sqrt{1/n\left[\sum d^2 - n\bar{d}^2\right]}$$

Degree of freedom ( D.F. ) = n -1

2. For comparison in different groups -

$$f = \frac{\overline{X_1} - \overline{X_2}}{S\sqrt{1/n_1 + 1/n_2}} \qquad S = \frac{(n_1 - 1)\,SD_1 + (n_2 - 1)\,SD_2}{n_1 + n_2 - 2}$$

Degree of freedom (D.F.) $n_1 + n_2 - 2$

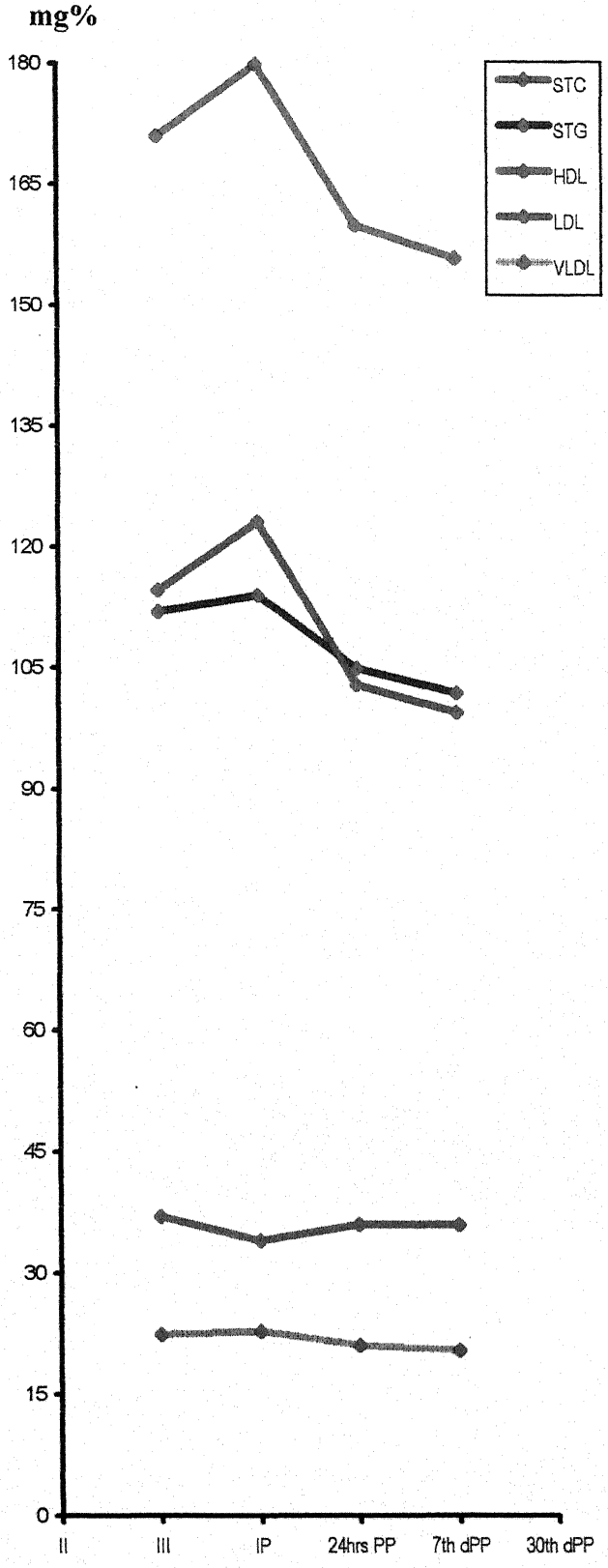
| | |
|---|---|
| $p > .05$ | not significant |
| $p < .05$ | Significant |
| $p < .01$ & $< .001$ | Highly Significant |

While. comparing two groups only those cases who had representation in both groups , were considered for stastical Analysis.

**TABLE II**

**serum lipoprotein profile in cases of preeclampsia during antepartunm , intrapatum and post partum period .**

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg % mean ± SD | 178.33± 21 | 196.77± 30 | 207.8± 28.86 | 183.2± 25.83 | 174.22± 26.9 | 172.5± 33.24 |
| STG mg % mean ± SD | 97.2± 16 | 106.66± 20.5 | 110± 20.33 | 99.9± 19.2 | 92± 19.54 | 89.5± 22.5 |
| HDLmg % mean ± SD | 34.8± 4.58 | 33.52± 5.52 | 32 ± 4.12 | 34± 4.61 | 35± 2.76 | 35± 3.36 |
| LDL mg % mean ± SD | 123.9± 14.94 | 140.56± 22.48 | 152.98± 22.5 | 127.9± 20.0 | 119.8± 21.01 | 116.1± 24.49 |
| VLDL mg % mean ± SD | 19.28± 3.3 | 21.2± 4.47 | 22.1± 3.89 | 20.38± 4.74 | 18.5± 4.11 | 17.9± 4.5 |
| no of Cases | 5 | 9 | 10 | 10 | 9 | 4 |




## PRE ECLAMPSIA GROUP

*Case no 1*

*Patient - Manorama*
*23yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Vegetarian*
* *C/o Swelling over feet*
* ***Paedal oedema present***
* *BP **146/96** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT normal*
* *No complications*
* *Out come ⇒ F.T.N.D, male baby wt.2.8 kg.*

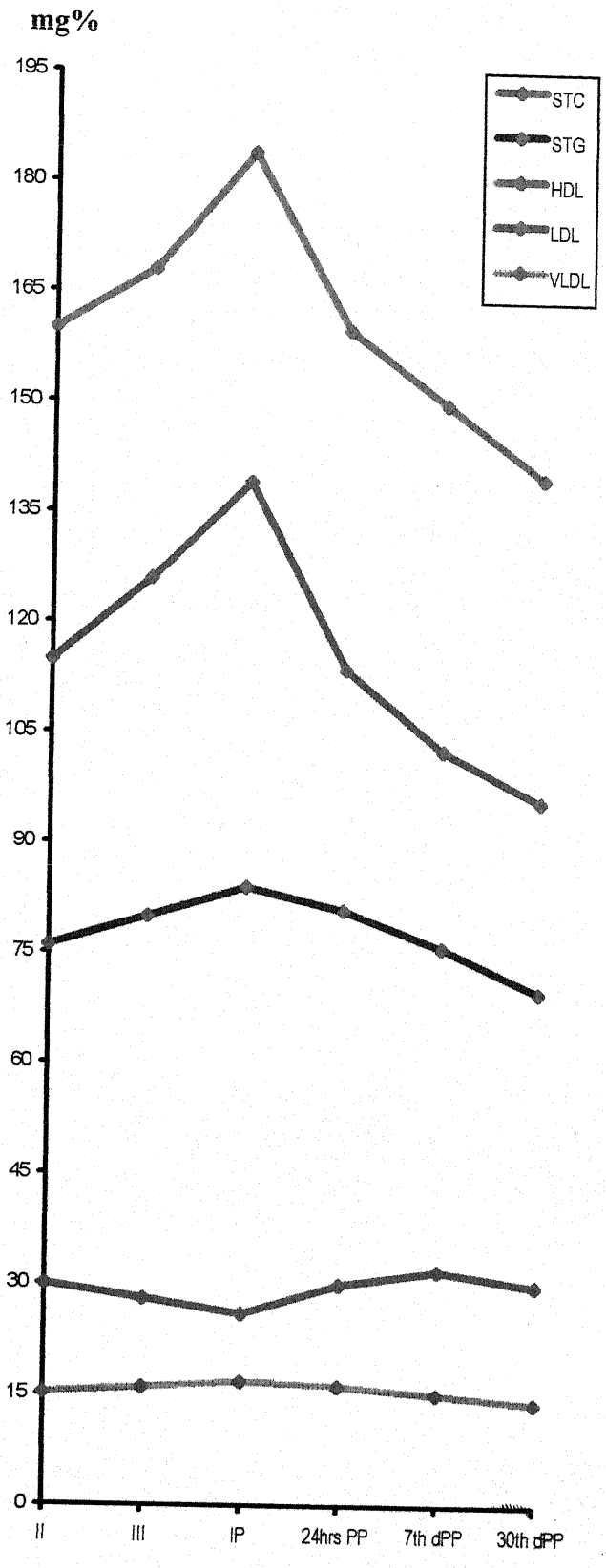
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 171 | 180 | 160 | 156 | - |
| STG | - | 112 | 114 | 105 | 102 | - |
| HDL | - | 37 | 34 | 36 | 36 | - |
| LDL | - | 114.6 | 123.2 | 103 | 99.6 | - |
| VLDL | - | 22.4 | 22.8 | 21 | 20.4 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *5.26% ↑ in STC, maximum value during labour*
* *11.1% ↓ in STC ,with in 24hrs PP*
* *9% ↑ in LDL , maximum value during labour*
* *17% ↓ in LDL , with in 24hrs PP*
* *8% ↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 2*

*Patient - Mamta Jain*
*21yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Vegetarian*
* *C/o Swelling over feet*
* ***Paedal oedema present***
* *BP **150/100** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin Present***
* *LFT & RFT normal*
* *No complications*
* *Out come ⇒ F.T.N.D, female baby wt.2.6 kg.*

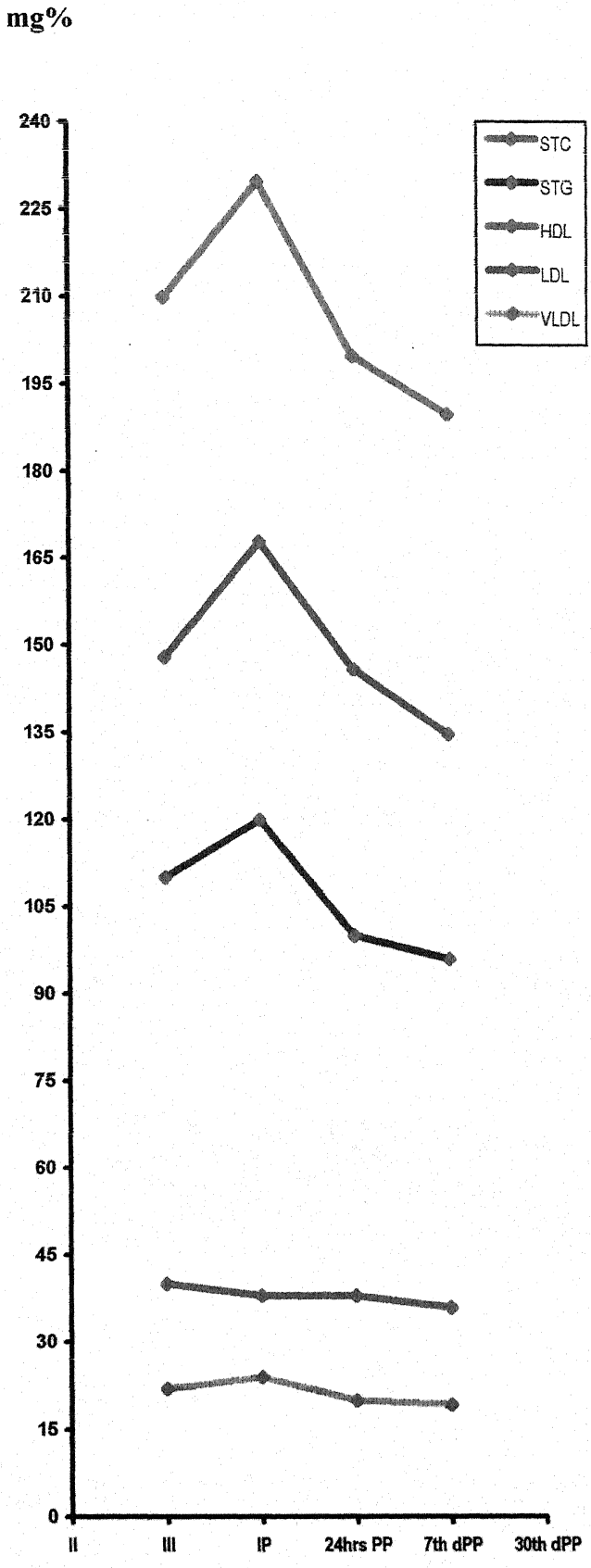
*Values in mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 160 | 168 | 184 | 160 | 150 | 160 |
| STG | 76 | 80 | 84 | 81 | 76 | 70 |
| HDL | 30 | 28 | 26 | 30 | 32 | 30 |
| LDL | 114.8 | 126 | 139.2 | 113.8 | 102.8 | 96 |
| VLDL | 15.2 | 16 | 16.8 | 16.2 | 15.2 | 14 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *15% ↑ in STC, maximum value during labour*
* *15% ↓ in STC ,with in 24hrs PP*
* *16% ↑ in LDL , maximum value during labour*
* *16% ↓ in LDL , with in 24hrs PP*
* *11% ↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 3*

*Patient - Parvati*
*20yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *C/o Excessive gain inbody weight*
* ***Paedal oedema present***
* *BP **160/104** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin present***
* *LFT Narmal & RFT Impaired*
* *Developed renal failure*
* *Out come ⇒ F.T.N.D, female baby wt.2.6 kg.*

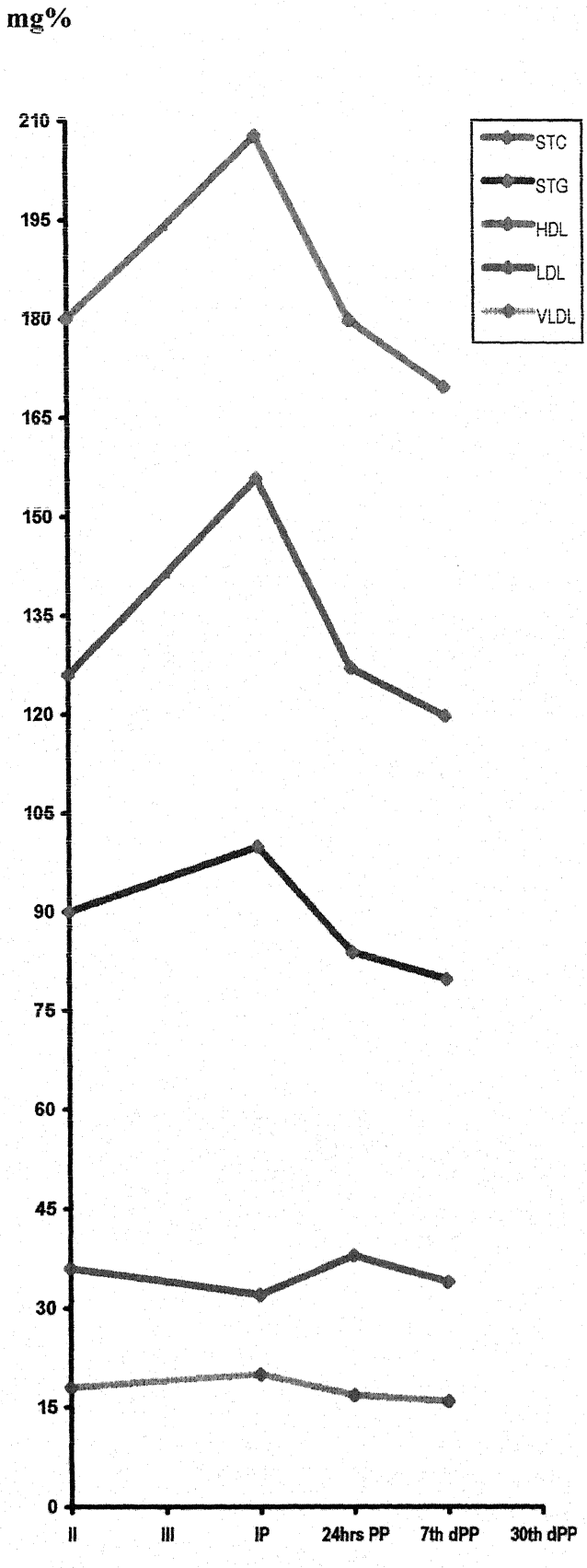
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 210 | 230 | 200 | 190 | - |
| STG | - | 110 | 120 | 100 | 96 | - |
| HDL | - | 40 | 38 | 38 | 36 | - |
| LDL | - | 148 | 168 | 146 | 134.8 | - |
| VLDL | - | 22 | 24 | 20 | 19.2 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***10%*** *↑ in STC, maximum value during labour*
* ***13%*** *↓ in STC ,with in 24hrs PP*
* ***13%*** *↑ in LDL , maximum value during labour*
* ***18%*** *↓ in LDL , with in 24hrs PP*
* ***5%*** *↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 4*

*Patient - Pupali Rai*
*26yrs*

* *$G_2 P_2 L_2$*
* *Upper Socioeconomic Status*
* *Non - Vegetarian*
* *Detected on routine checkup*
* ***Paedal oedema present***
* *BP **148/92** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT Normal*
* *No complications*
* *Out come ⇒ Elective C S, male baby wt.2.9 kg.*

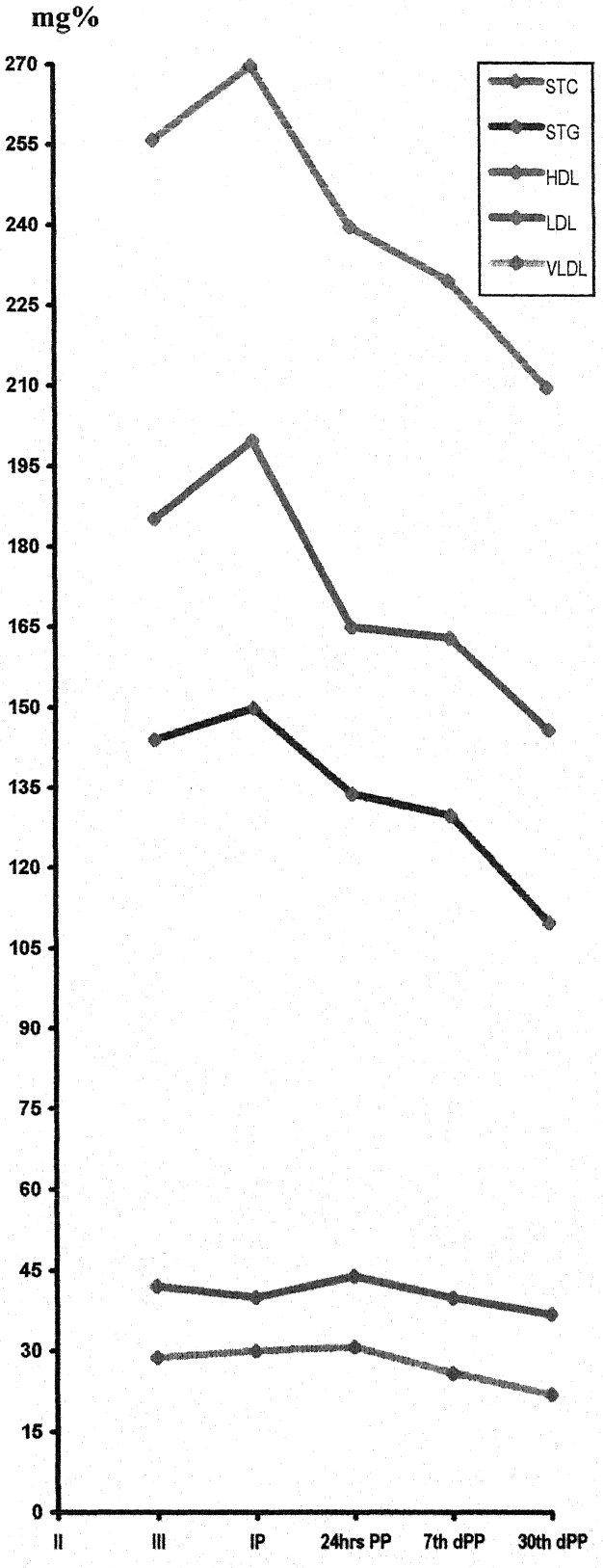
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 180 | - | 208 | 180 | 170 | - |
| STG | 90 | - | 100 | 84 | 80 | - |
| HDL | 36 | - | 32 | 38 | 34 | - |
| LDL | 126 | - | 156 | 127.2 | 120 | - |
| VLDL | 18 | - | 20 | 16.8 | 16 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***16%*** *↑ in STC, maximum value during labour*
* ***14%*** *↓ in STC ,with in 24hrs PP*
* ***16%*** *↑ in LDL , maximum value during labour*
* ***13%*** *↓ in LDL , with in 24hrs PP*
* ***11%*** *↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 5*

*Patient - Sangeeta*
*22yrs*

* *Primi Gravida*
* *Upper Socioeconomic Status*
* *Non - Vegetarian*
* *C/o Swelling over feet*
* ***Paedal oedema present***
* *BP **156/100** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT Normal*
* *No complications*
* *Out come ⇒ F.T.N.D, male baby wt. 2.8 kg.*

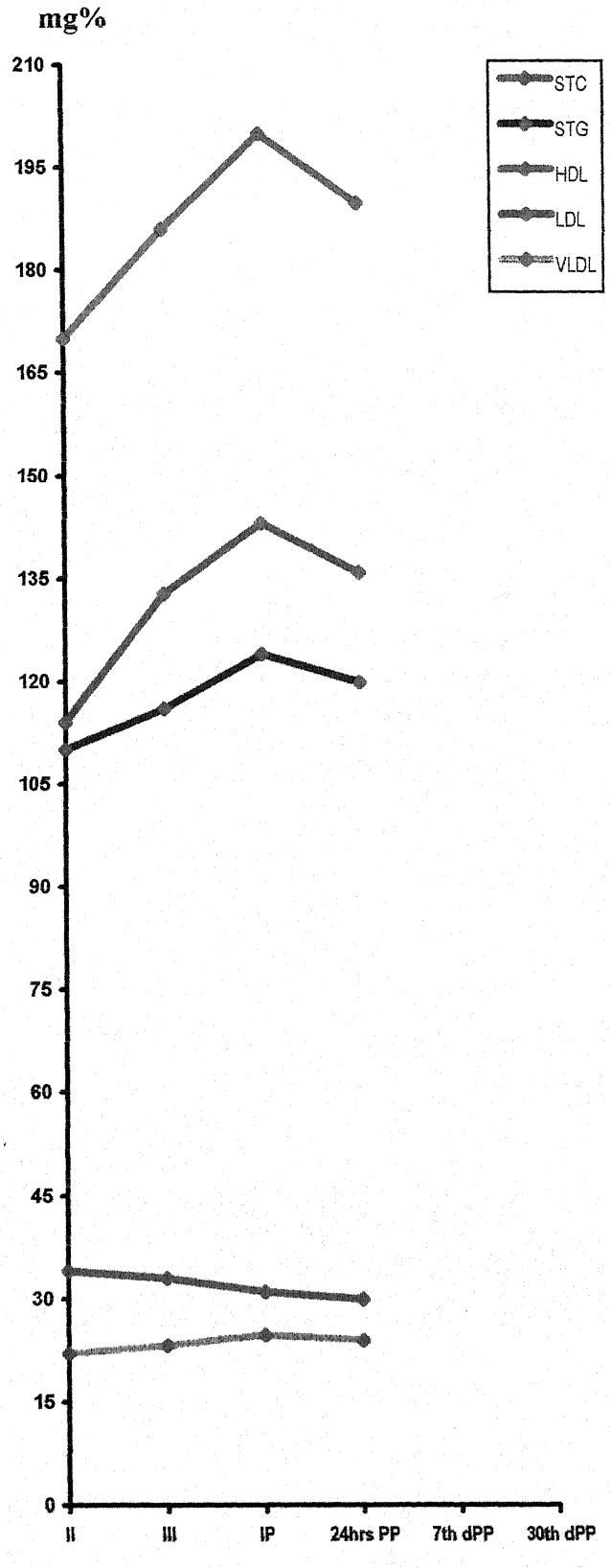
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 256 | 270 | 240 | 230 | 210 |
| STG | - | 144 | 150 | 134 | 130 | 110 |
| HDL | - | 42 | 40 | 44 | 40 | 37 |
| LDL | - | 185.2 | 200 | 165.2 | 163 | 146 |
| VLDL | - | 28.8 | 30 | 30.8 | 26 | 22 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *6% ↑ in STC, maximum value during labour*
* ***11%** ↓ in STC ,with in 24hrs PP*
* ***9%** ↑ in LDL , maximum value during labour*
* ***17.5%** ↓ in LDL , with in 24hrs PP*
* ***5%** ↓ in HDL , up to labour*




# PRE ECLAMPSIA GROUP

*Case no 6*

*Patient - Sangeeta Jain*
*26yrs*

* *G3P2L2*
* *Upper Socioeconomic Status*
* *Vegetarian*
* *Detcted on routine checkup*
* ***Paedal oedema present***
* *BP **144/100** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT Normal*
* *No complications*
* *Out come ⇒ F.T.N.D, male baby wt. 2.6 kg.*

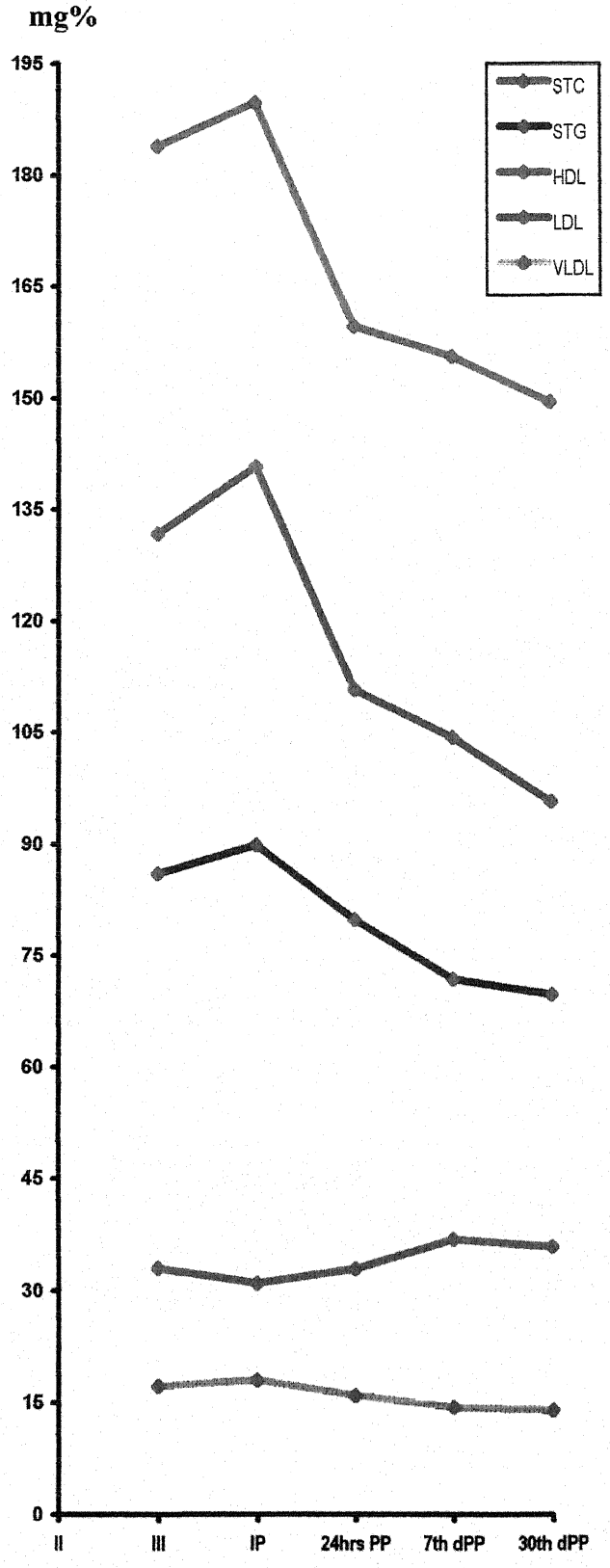
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 170 | 186 | 200 | 190 | - | - |
| STG | 110 | 116 | 124 | 120 | - | - |
| HDL | 34 | 33 | 31 | 30 | - | |
| LDL | 114 | 132.8 | 143.2 | 136 | - | - |
| VLDL | 22 | 23.2 | 24.8 | 24 | - | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***17%*** *↑ in STC, maximum value during labour*
* ***5%*** *↓ in STC ,with in 24hrs PP*
* ***18%*** *↑ in LDL , maximum value during labour*
* ***5%*** *↓ in LDL , with in 24hrs PP*
* ***9%*** *↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 7*

*Patient - Guddi*
*22yrs*

* *G2P2L2*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *C/o Excessive gain in bodyweight*
* ***Paedal oedema present***
* *BP **148/104** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT Normal*
* *No complications*
* *Out come ⇒ F.T.N.D, female baby wt. 2.6 kg.*

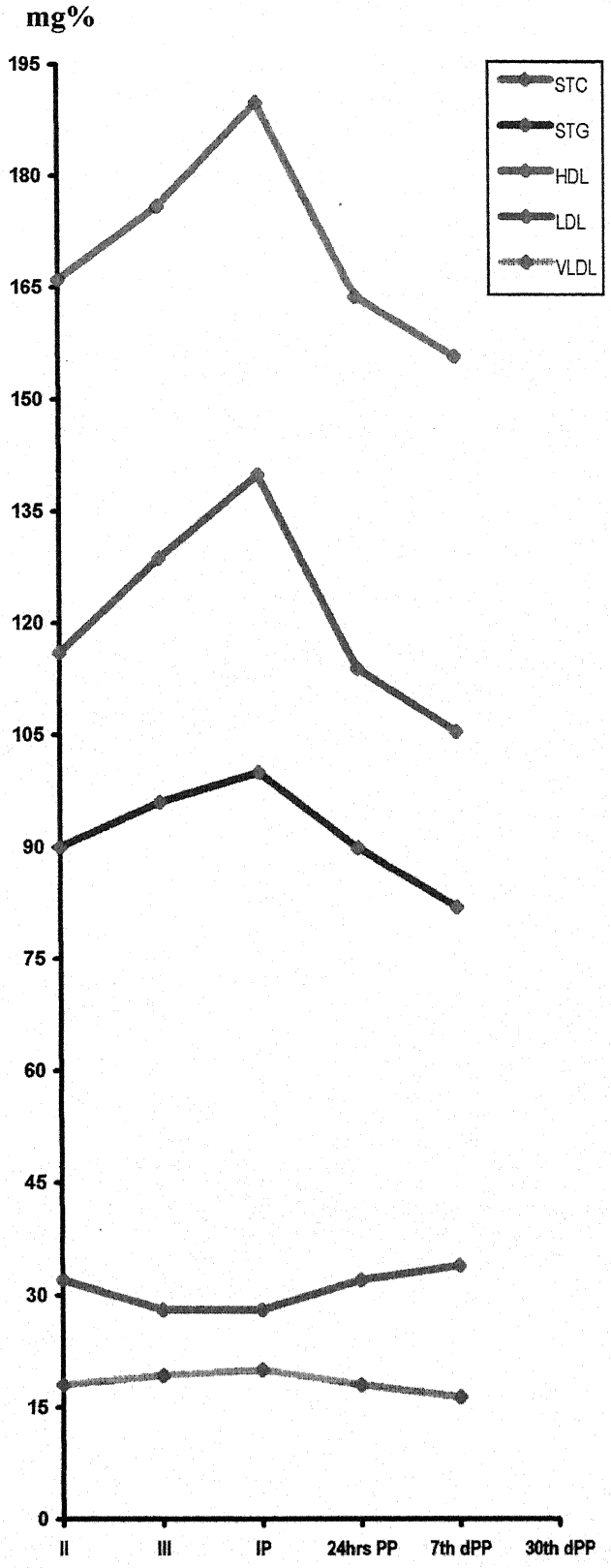
*Values mg%*

| | | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|---|
| STC | - | | 184 | 190 | 160 | 156 | 150 |
| STG | - | | 86 | 90 | 80 | 72 | 70 |
| HDL | - | | 33 | 31 | 33 | 37 | 36 |
| LDL | - | | 131.8 | 141 | 111 | 104.6 | 96 |
| VLDL | - | | 17.2 | 18 | 16 | 14.4 | 14 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *4% ↑ in STC, maximum value during labour*
* ***16%** ↓ in STC ,with in 24hrs PP*
* ***9%** ↑ in LDL , maximum value during labour*
* ***23%** ↓ in LDL , with in 24hrs PP*
* ***6%** ↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 8*

*Patient - Sudha*
*24yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *Detected on routine checkup*
* *Paedal oedema Absent*
* *BP **180/110** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin present***
* *LFT & RFT Normal*
* *Out come⇒ Premature*
  *Vaginal delivery, female baby wt. 2.0 kg.*

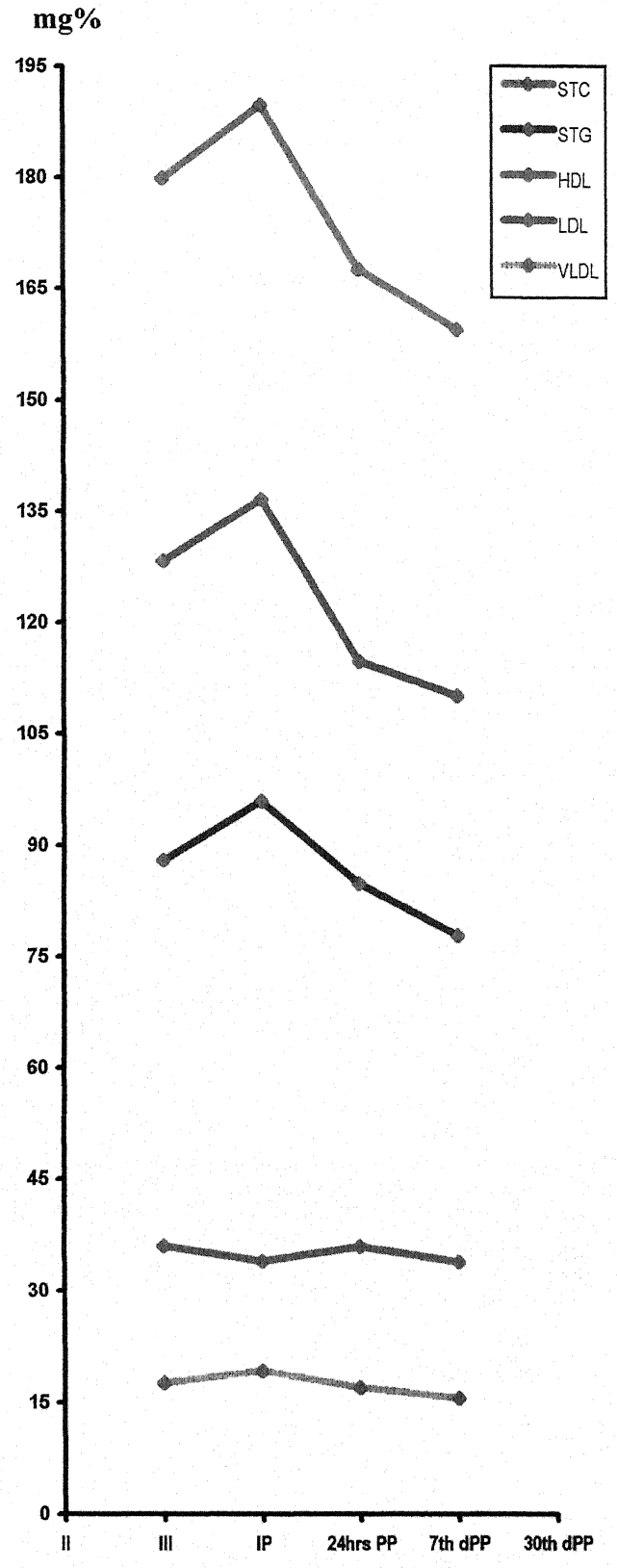
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 166 | 176 | 190 | 164 | 156 | - |
| STG | 90 | 96 | 100 | 90 | 82 | - |
| HDL | 32 | 28 | 28 | 32 | 34 | - |
| LDL | 116 | 128.8 | 140 | 114 | 105.6 | - |
| VLDL | 18 | 19.2 | 20 | 18 | 16.4 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***15%*** *↑ in STC, maximum value during labour*
* ***14%*** *↓ in STC ,with in 24hrs PP*
* ***19%*** *↑ in LDL , maximum value during labour*
* ***19%*** *↓ in LDL , with in 24hrs PP*
* ***12%*** *↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 9*

*Patient - Kiran*
*24yrs*

* *G3P2L2*
* *Middle Socioeconomic Status*
* *Non Vegetarian*
* *C/o Swelling over feet*
* ***Paedal oedema present***
* *BP **152/96** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin present***
* *LFT Impaired & RFT Normal*
* *Out come⇒ F.T.N.D, female baby wt. 2.25 kg.*

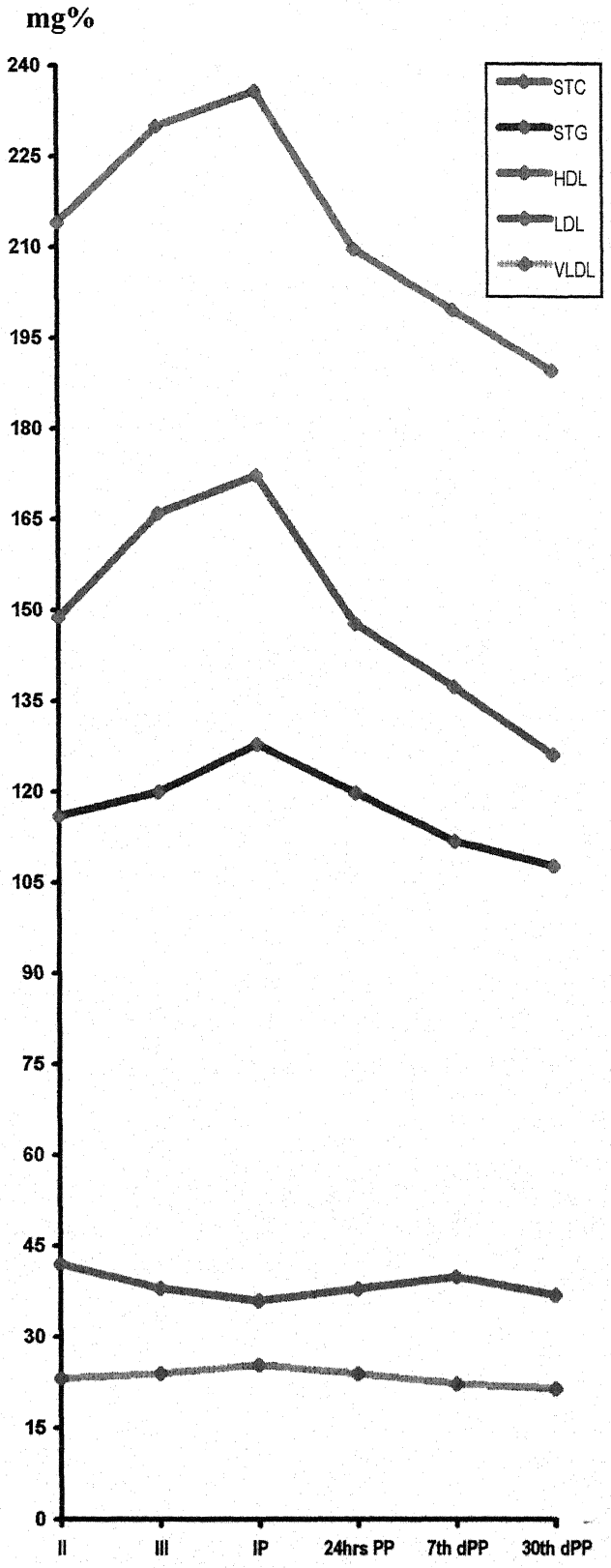
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 180 | 190 | 168 | 160 | - |
| STG | - | 88 | 96 | 85 | 78 | - |
| HDL | - | 36 | 34 | 36 | 34 | - |
| LDL | - | 128.4 | 136.8 | 115 | 110.4 | - |
| VLDL | - | 17.6 | 19.2 | 17 | 15.6 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***6%*** *↑ in STC, maximum value during labour*
* ***12%*** *↓ in STC ,with in 24hrs PP*
* ***9%*** *↑ in LDL , maximum value during labour*
* ***16%*** *↓ in LDL , with in 24hrs PP*
* ***6%*** *↓ in HDL , up to labour*




## PRE ECLAMPSIA GROUP

*Case no 10*

*Patient - Vimla*
*22yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *C/o Swelling over feet*
* ***Paedal oedema present***
* *BP **148/104** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - Albumin absent*
* *LFT & RFT Normal*
* *Out come⇒ Premature Vaginal delivery male baby*
*wt. 2.4 kg.*

*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 214 | 230 | 236 | 210 | 200 | 190 |
| STG | 116 | 120 | 128 | 120 | 112 | 108 |
| HDL | 42 | 38 | 36 | 38 | 40 | 37 |
| LDL | 149 | 169 | 172 | 148 | 137.6 | 126.4 |
| VLDL | 23 | 24 | 25.6 | 24 | 22.4 | 21.6 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***11%*** *↑ in STC, maximum value during labour*
* ***13%*** *↓ in STC ,with in 24hrs PP*
* ***14%*** *↑ in LDL , maximum value during labour*
* ***12%*** *↓ in LDL , with in 24hrs PP*
* ***11%*** *↓ in HDL , up to labour*

Table II shows that STC level raised from 178.33 ± 21 to 196.77 ± 30 from IInd trimester to IIIrd trimester and reaching a peak during intra partum period of 207.8 ± 28.86 mg % this rise from IInd trimester to intra partum period was stastically significant

| | | |
|---|---|---|
| | II Vs I.P. | P < .001 |
| Similarly | IP Vs PP 1ST d | P < .001 |
| | IP Vs PP 7TH d | P < .001 |
| | II Vs III | P < .05 |
| | III Vs I.P. | P > .05 |

LDL raised from a Basal value of 123.9 ± 14.94 during IInd trimester to 152.98 ± 22.50 during intra partum period . This difference was statistically significant

| | |
|---|---|
| II Vs I.P. | p < .001 |

This LDL reached to values nearly equal to value at 2nd trimester on 30th post partum day

| | |
|---|---|
| IP Vs PP 7th day | p < .05 |
| IP Vs PP 30th day | p < .05 |
| II Vs III | p < .05. |

HDL level was 34.8 ± 4.58 during IInd trimester , it declined to 32.0 ± 4.12 during labour and then again raised to 35.0 ± 3.36 on the 30th post partum day.

| | |
|---|---|
| II Vs I.P. | p < 0.05 |
| III Vs I.P. | p > .05 |

STG and VLDL showed a peak during labour from their values at 2nd trimester of 97.2 ± 16 and 19.28 ± 3.3 to 110 ± 20.33 to 22.1 ± 3.89 respectively . This rise in STG and VLDL was significant statistically

| | |
|---|---|
| IInd Vs IP | p < .05 |

## TABLE III
## serum lipoprotein profile in cases of mild preeclampsia

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg % mean ± SD | 188± 23.06 | 205.2± 35.98 | 214.33± 33.4 | 190± 30.98 | 182.4± 32.09 | 183.33 ± 30.55 |
| STG mg % mean ± SD | 105.33± 13.6 | 117± 20.68 | 120.6± 21.35 | 107.33± 21.56 | 98.4± 22.71 | 96± 22.53 |
| HDLmg % mean ± SD | 36.3± 2.3 | 35.2± 3.2 | 33.8± 4.42 | 36.5± 3.8 | 37.4 ± 2.82 | 36.8± 2.4 |
| LDL mg % mean ± SD | 129.33± 22.33 | 146.6± 27.16 | 155.8± 27.11 | 131.83± 23.09 | 125.4± 25.37 | 122± 25.15 |
| VLDL mg % mean ± SD | 21± 2.64 | 23.2± 4.19 | 24.12± 4.28 | 21.5± 5.68 | 19.68± 4.95 | 19.2± 4.85 |
| no of Cases | 3 | 5 | 6 | 5 | 5 | 3 |

Table III shows that STC raised from a mean of 188 ± 23.06 to 214.33 ± 33.4 during labour and then came down to 182.4 ± 32.09 at 7th P.P. day . The fall in STC from I.P. period to 7th P.P. day was stastically significant

| | |
|---|---|
| II Vs IP | $p < .05$ |
| IP Vs PP 1st day | $p < .05$ |
| IP Vs PP 7th day | $p < .05$ |
| IP Vs PP 30th day | $p < .05$ |

. LDL raised from it's value at 2nd trimester of 129.33 ± 22.36 to 155.8 ± 27.11 during labour and came down to 125.4 ± 25.37 on 7th P.P. day . This was statistically significant

| | |
|---|---|
| II Vs I.P.<br>I.P. Vs 1st PP<br>I.P. Vs 7md PP<br>I.P. Vs 30th day PP | $P < .05$ |

HDL declined from 36.3 ± 2.3 at 2nd trimester to a value of 33.8 mg % and then raised again. mean STG was 105.33 ± 13.61 at 2nd trimester reached a peak to 120.6 ± 21.35 mg % term and then started falling reaching to 96 mg % at 30th post partum day . Similar trend was followed by VLDL also.

## Table IV
## serum lipoprotein profile in cases of severe preeclampsia

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg % mean ± SD | 163± 4.24 | 183.5± 18.35 | 198.5± 21.18 | 173± 18.87 | 164± 17.8 | 140±0 |
| STG mg % mean ± SD | 83±9.89 | 95.33± 12.96 | 101.33± 15.16 | 90±15.09 | 84.66± 9.16 | 70±0 |
| HDLmg % mean ± SD | 32± 1.41 | 31.5± 5.74 | 30±4.43 | 33± 3.65 | 34± 1.63 | 30± 0 |
| LDL mg % mean ± SD | 115.4± 8.2 | 132.57± 10.19 | 146.25± 13.52 | 122.54± 16.58 | 113± 14.62 | 96± 0 |
| VLDL mg % mean ± SD | 16.6± 1.97 | 19.06± 2.95 | 20.2± 3.17 | 16± 2.64 | 16.9± 1.83 | 14±0 |
| no of Cases | 2 | 4 | 4 | 4 | 4 | 1 |

Table IV shows that STC raised markedly from IInd trimester to IIIrd trimester and from IIIrd trimester to intra partum period . it's value was 163 ± 4.24 at 2nd trimester and 198.5 ± 21.18 mg % during labour . The fall was maximum at the 30th PP day when it was 140 mg % . Similarly LDL raised from 115 ± 8.2 at 2nd trimester to 146.25± 13.52 during labour and declined there after reaching to 113 ±14. 62 at 7th P.P. day and 96 mg % on 30th P.P. day . STG raised from 83 ± 9.89 at 2nd trimester to a peak during labour of

101.33 ± 15.16 mg and then declined therafter . Interestingly HDL decreased very less from 32 ± 1.41 mg % at 2nd trimester to 30.0 ± 4.43 during labour.

| | | |
|---|---|---|
| For STC | II Vs III | $p < .05$ |
| | II Vs I.P. | $p < .001$ |
| | IP VS 7th PP | $p < .001$ |
| | IP Vs 30th PP | $p < .001$ |
| For LDL | II Vs III | $p < .05$ |
| | II Vs IP | $p < .001$ |
| | I.P. Vs 1st PP | $p < .001$ |
| | I.P. Vs 7th PP | $p < .001$ |
| | I.P. Vs 30th | $P < .001$ |

## TABLE V
## Serum Lipoprotein Profile in Pre-eclampsia cases with low Birth Weight babies

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg% mean± SD | 190± 33.94 | 195.33± 30.09 | 205± 26.56 | 180.66± 25.44 | 172± 24.33 | 190± 0 |
| STG mg% mean± SD | 103± 18.33 | 101.33± 14.23 | 108.0± 17.43 | 98.33± 18.43 | 90.66± 18.58 | 108± 0 |
| HDLmg% mean± SD | 37± 7.07 | 33.3± 4.58 | 32±4 | 35.33± 3.08 | 36.0± 2.82 | 36± 0 |
| LDLmg% mean± SD | 132.5± 22.62 | 141.66± 23.68 | 151.6± 19.46 | 126.66± 19.35 | 114.0± 17.69 | 126± 0 |
| VLDL mg% mean± SD | 20.6± 9.8 | 20.3± 4.2 | 21.6± 3.5 | 19.7±3.9 | 18.13± 3.9 | 21.6± 0 |
| no of case | 2 | 3 | 3 | 3 | 3 | 1 |

Table V shows that STC raised from 190 ± 33.94 mg at 2nd trimester to 205 ± 26.56 during labour and then declined to 172 ± 24.3 mg % at 7th PP day_ . This rise statistically significant .

| | |
|---|---|
| II Vs IP | $p < .05$ |
| IP Vs 7th PP day | $p < .001$ |
| IP Vs 1st PP day | $p < .05$ |

LDL raised from 132.5 ± 22.62 mg % at 2nd trimester to 141.66 ± 23.68 at 3rd trimester , reaching a peak at labour of 151.6 ± 19.46 then declined to 126.41 ± 19.35 at 1st P.P. day and 114.0 ± 17.69 at 7th PP day .

| | |
|---|---|
| II Vs IP | $p < .05$ |
| IP Vs 1st PP day | $p < .05$ |

IP Vs 7th PP day $p < .05$
IP Vs 30th PP day $p < .05$

HDL decreased from 37.0± 7.07 at 2nd trimester to 32± 4 at labour . This fall was statistically significant

II Vs IP $< .05$

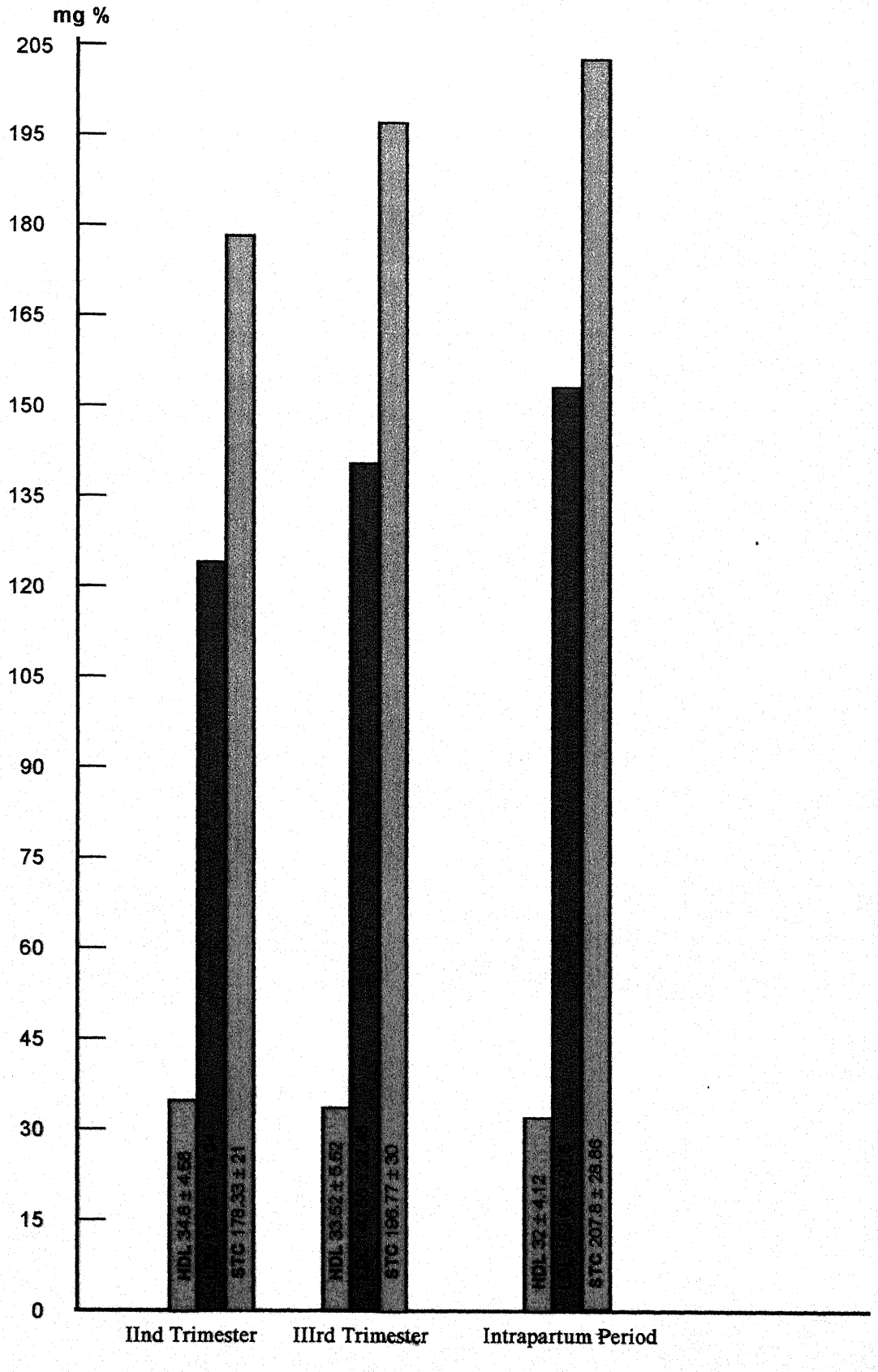
STG and VLDL showed a very small rise in their value maximum during labour.

## Table VI
## Lipoprotein profile regarding parity in subjects with pre-eclampsia

| | Parity | II trimester | IIItrimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|---|
| STC mg % mean±SD | Primi | 180± 29.59 | 201.66± 36.2 | 215± 36.09 | 188.33± 33.09 | 180± 31.78 | 180± 36.05 |
| | Multi | 175± 7.07 | 183.33± 3.08 | 200± 9.38 | 194.5± 27.1 | 162.0± 7.21 | 150± 0 |
| LDL mg % mean±SD | Primi | 126.±66 15.95 | 130.5± 34.46 | 156.66± 28.06 | 131.83± 38.03 | 125.0± 25.13 | 122.0± 25.17 |
| | Multi | 120± 36 | 131± 2.54 | 144.2± 8.22 | 122.25± 11.4 | 111.66± 8.09 | 96± 0 |
| HDL mg % mean±SD | Primi | 35± 6.44 | 34.5± 6.40 | 33.50± 4.89 | 35.33± 4.97 | 35.3± 3.22 | 34.66± 4.12 |
| | Multi | 35± 1.41 | 32.3± 2.12 | 31.0± 1.52 | 33.5± 3.51 | 35 ± 1.73 | 35± 0 |
| no of Cases | Primi | 3 | 6 | 6 | 6 | 6 | 3 |
| | Multi | 2 | 3 | 4 | 4 | 3 | 1 |

. This shows that STC and LDL values were higher in Primi Gravidae in comparison to Multi Gravidae in the corresponding period of pregnancy during labour and in post partum period . This difference was however statistically not significant . At 30th PP day STC and LDL was 180 ± 36.05 and 122 ± 25.17 mg % . In primi Gravidae and 150 mg % and 96 mg % in multi Gravidae . there was not much difference in HDL values in both subgroups. Except during labour it was high in primigravidae.

**Multiple BAR diagram showing changes in various lipid fraction during pregnancy and labour in patients with preeclmpsia**



## TABLE VII
## Serum Lipoprotein profile in cases of eclampsia during Antepartum,Intrapartum & post partum period

| | IInd trimester | IIIrd trimester | IP period | 1st post partum day | 7th post partum day | 30th post partum day |
|---|---|---|---|---|---|---|
| STC mg % Mean ± SD | --- | 219.37± 36.3 | 234.41 ± 40.17 | 209.75±31.2 | 199.75± 28.6 | 180.83± 24.5 |
| STG mg % Mean ± SD | --- | 111.75± 24.79 | 114.82± 26.46 | 103.56± 21.49 | 97.87± 19.7 | 85.5± 18.02 |
| HDL mg % Mean ± SD | --- | 32.4± 3.96 | 29± 4.47 | 30.1± 5.4 | 28.25± 6.51 | 29.6 ± 3.88 |
| LDL mg% mean ± SD | --- | 156.88± 29.96 | 178.82± 32.03 | 157.37± 20.87 | 148± 25.69 | 131± 16.27 |
| VLDL mg % mean± SD | --- | 22.35± 5.12 | 23±5.38 | 22.25± 4.40 | 19.5± 3.94 | 17± 3.94 |
| no of cases (n) | --- | 17 | 17 | 16 | 16 | 6 |

Table VII shows that STC raised from 219.37 ± 36.3 mg at 3rd trimester to 234.41 ± 40.17 mg % at term and then declined to 209.75 ± 31.2 at 1st P.P. day , 199.75 ± 28.6 at 7th P.P. day and 180.83 ± 24.5 mg % at 30th P.P. day . Rise from IIIrd trimester to I.P. period was statistically insignificant.

III Vs I.P. $p < .001$
IP Vs 1st PP day $p < .001$
IP Vs 7th PP day $p < .001$
IP Vs 30th PP day $p < .001$

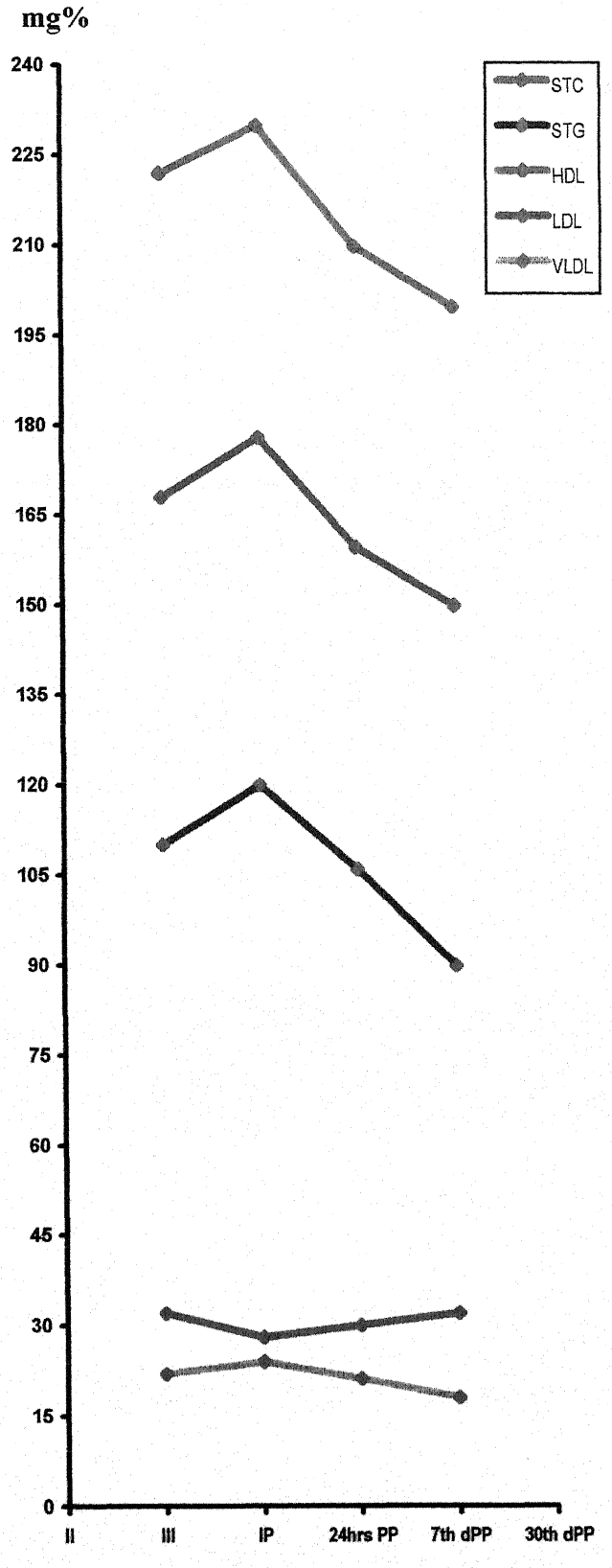
LDL raised from 156.88 ± 29.96 mg % at 3rd trimester to 178.82 ± 32 during labour which declined to 157.37 ± 20.87 at 1st Pp day and 131 ± 16.27 at 30th PP day.

III Vs IP $p < .001$
IP Vs 1st PP day $p < .001$
IP Vs 7th PP day $p < .001$
IP Vs 30th PP day $p < .001$

HDL value was 32.41 ± 3.96 at 3rd trimester which declined to 29 ± 4.47 during labour then raised to 30.1 ± 5.4 on 1st P.P. day , again raised to 28.25 ± 6.51 on 7th PP day.

III Vs IP $p < .001$

There was very slight rise in STG & VLDL upto labour from 3rd trimester.




## ECLAMPSIA GROUP

*Case no 1*

*Patient - Rajni*
*23yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Non Vegetarian*
* *C/o Convulsions for one day*
* ***Paedal oedema present***
* *BP **160/110** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin present***
* *LFT & RFT Normal*
* *Out come⇒ Premature Vaginal delivery female baby*
*wt. 2.4 kg.*

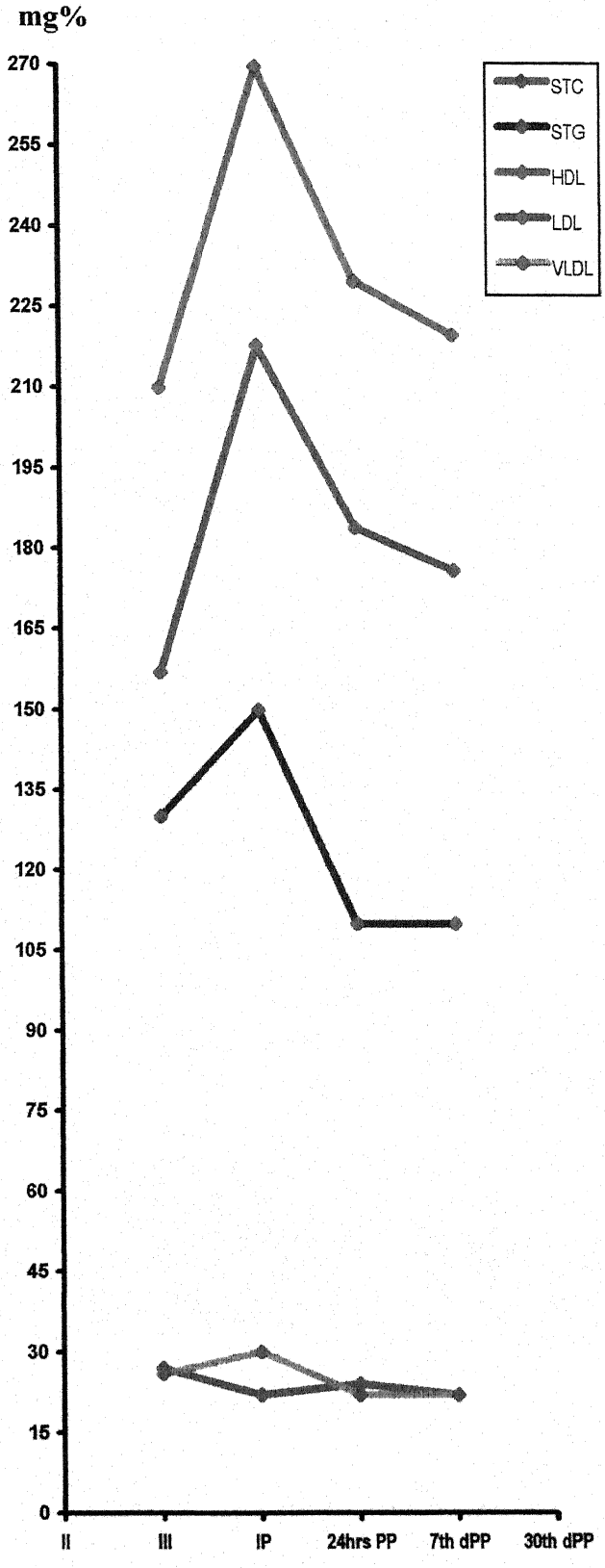
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 222 | 230 | 210 | 200 | - |
| STG | - | 110 | 120 | 106 | 90 | - |
| HDL | - | 32 | 26 | 30 | 32 | - |
| LDL | - | 168 | 178 | 159.8 | 150 | - |
| VLDL | - | 22 | 24 | 21.2 | 18 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***5%*** *↑ in STC, maximum value during labour*
* ***9%*** *↓ in STC ,with in 24hrs PP*
* ***8%*** *↑ in LDL , maximum value during labour*
* ***12%*** *↓ in LDL , with in 24hrs PP*
* ***12%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 2*

*Patient - Guddi*
*26yrs*

* *G3P2L2*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***Unconsciouss during admission***
* *BP **150/100** mm Hg*
* *Obstetrical & other systemic examination NAD*
* *Urine - **Albumin present***
* *LFT Normal & RFT Impaired*
* *Out come⇒ Spontaneous expulsion of male dead foetus*

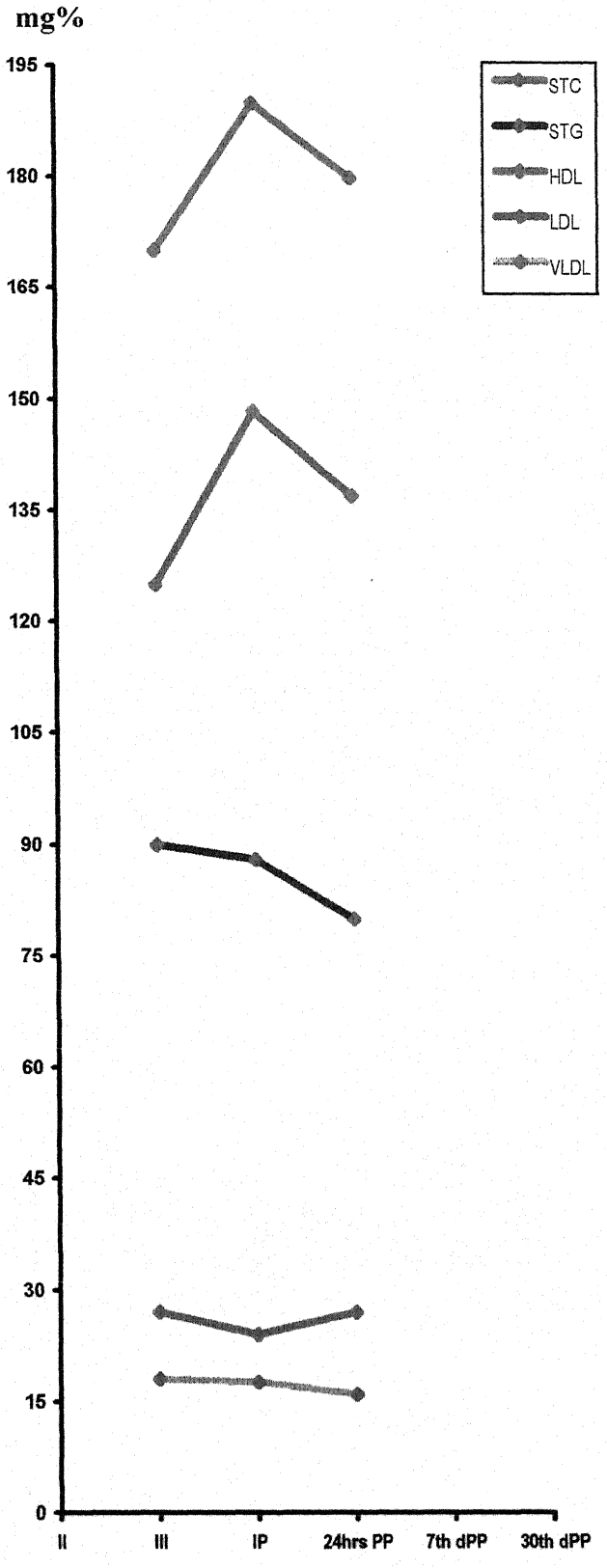
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 210 | 270 | 230 | 220 | - |
| STG | - | 130 | 150 | 110 | 110 | - |
| HDL | - | 27 | 22 | 24 | 22 | - |
| LDL | - | 157 | 218 | 184 | 176 | - |
| VLDL | - | 26 | 30 | 22 | 22 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***29%*** ↑ *in STC, maximum value during labour*
* ***15%*** ↓ *in STC ,with in 24hrs PP*
* ***35%*** ↑ *in LDL , maximum value during labour*
* ***14%*** ↓ *in LDL , with in 24hrs PP*
* ***19%*** ↓ *in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 3*

*Patient - Meena*
*25yrs*

* *Primi Gravida*
* *Upper Socioeconomic Status*
* *Non Vegetarian*
* ***C/o Convulsions for one day***
* ***Paedal oedema present***
* *BP **170/100** mm Hg*
* *Urine - **Protein present***
* *LFT Normal & RFT Impaired*
* *Developed renal failure*
* *Out come⇒ F.T.N.D, male baby wt. 2.8 kg*

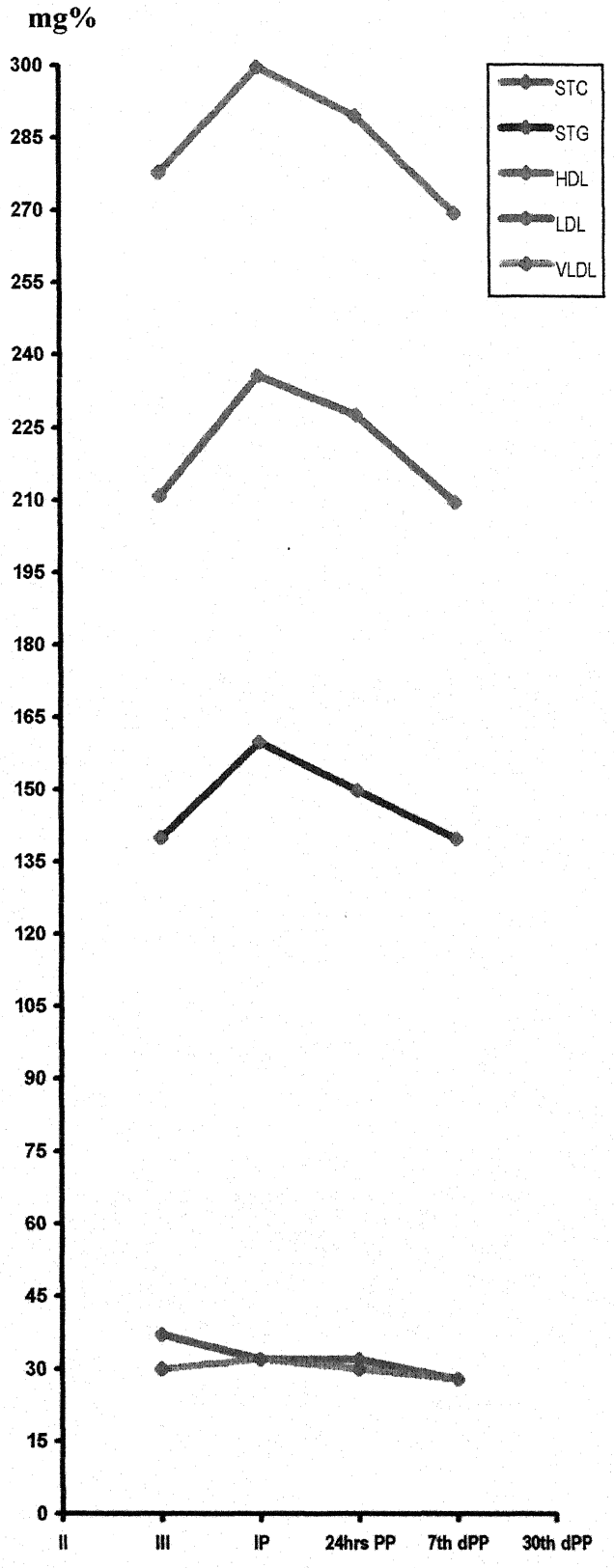
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 170 | 190 | 180 | - | - |
| STG | - | 90 | 88 | 80 | - | - |
| HDL | - | 27 | 24 | 27 | - | - |
| LDL | - | 125 | 148.4 | 137 | - | - |
| VLDL | - | 18 | 17.6 | 16 | - | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***12%*** *↑ in STC, maximum value during labour*
* ***6%*** *↓ in STC ,with in 24hrs PP*
* ***20%*** *↑ in LDL , maximum value during labour*
* ***7%*** *↓ in LDL , with in 24hrs PP*
* ***11%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 4*

*Patient - Hemwati*
*22yrs*

* *Primi Gravida*
* *Middel Socioeconomic Status*
* *Vegetarian*
* ***Unconscious during admission***
* ***Paedal oedema present***
* *BP **140/96** mm Hg*
* *Urine - **Protein present***
* *LFT Impaired & RFT Normal*
* *Out come⇒ Spontaneous expulsion of premature male dead baby*

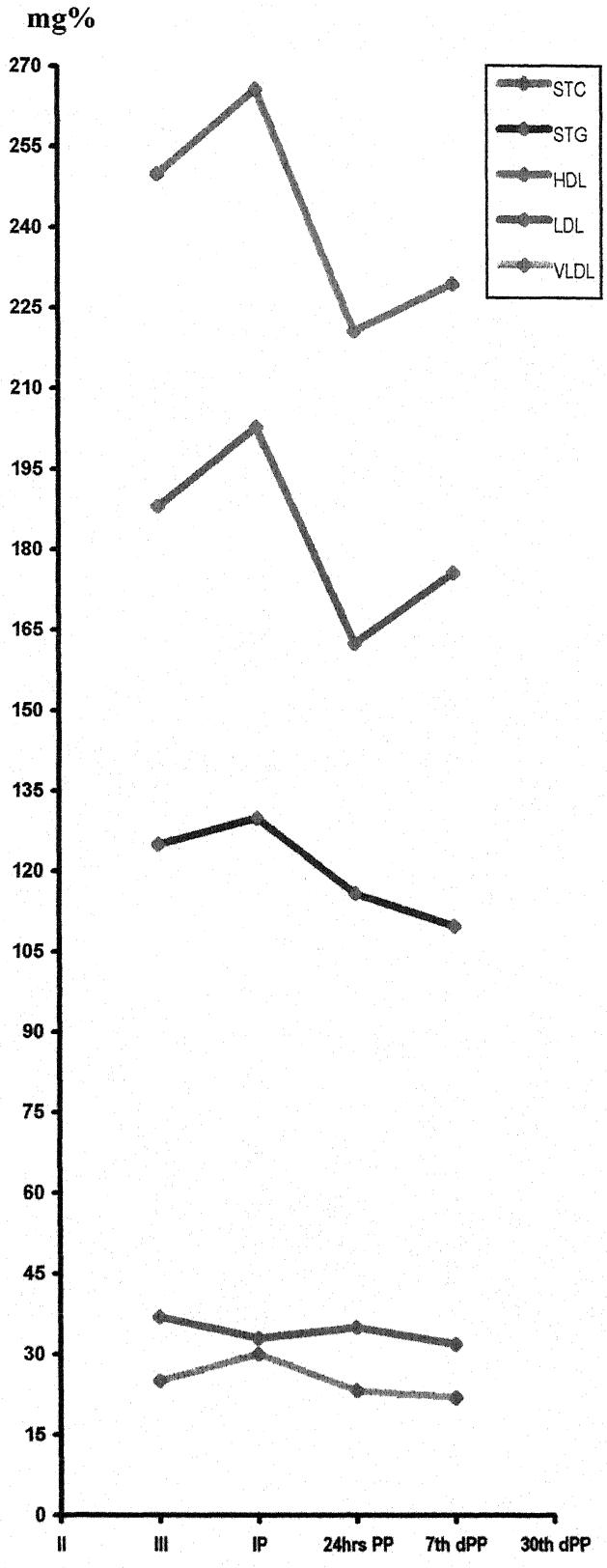
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 278 | 300 | 290 | 270 | - |
| STG | - | 150 | 160 | 150 | 140 | - |
| HDL | - | 37 | 32 | 32 | 28 | - |
| LDL | - | 211 | 236 | 228 | 210 | - |
| VLDL | - | 30 | 32 | 30 | 28 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *8% ↑ in STC, maximum value during labour*
* *3% ↓ in STC ,with in 24hrs PP*
* *12% ↑ in LDL , maximum value during labour*
* *3% ↓ in LDL , with in 24hrs PP*
* *13% ↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 5*

*Patient - Kashi bai*
*25yrs*

* *G1P1L1*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***Unconscious during admission***
* ***Paedal oedema present***
* *BP **140/110** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ F.T.N.D, female baby wt 2.7 kg*

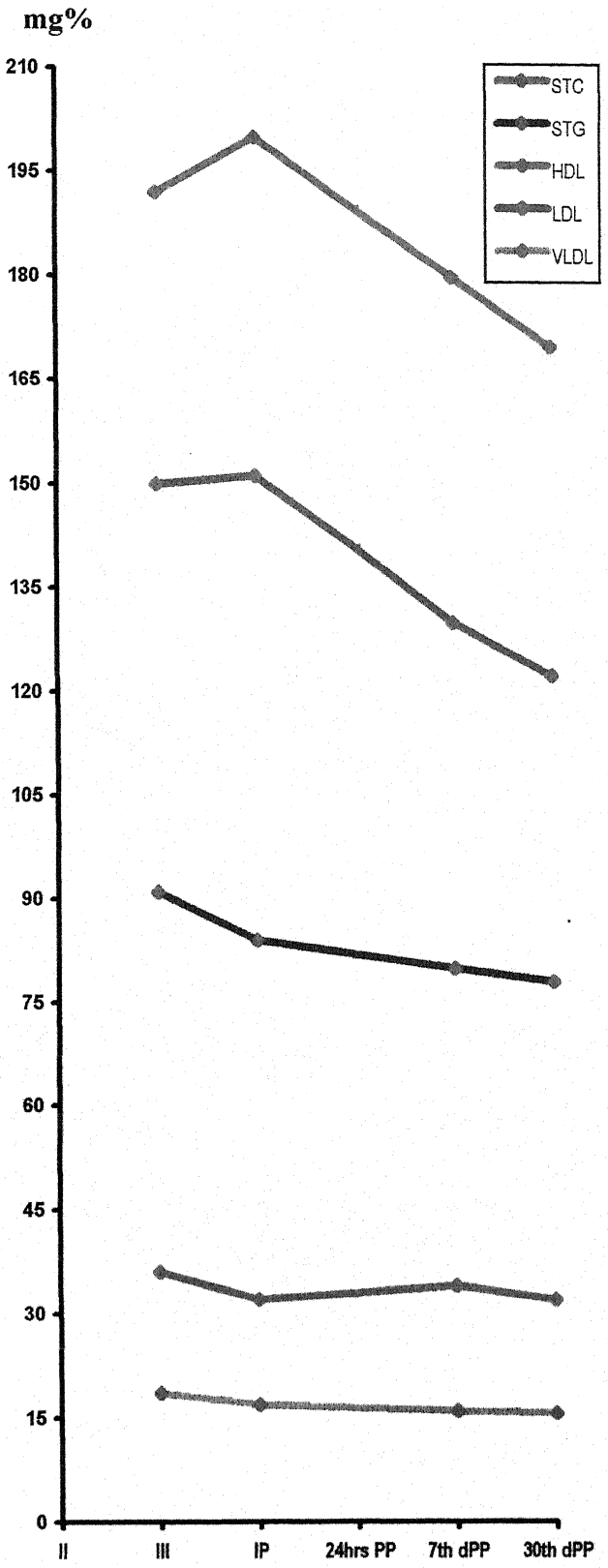
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 250 | 266 | 221 | 230 | - |
| STG | - | 125 | 130 | 116 | 110 | - |
| HDL | - | 37 | 33 | 35 | 32 | - |
| LDL | - | 188 | 203 | 162.8 | 176 | - |
| VLDL | - | 25 | 30 | 23.2 | 22 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***7%*** *↑ in STC, maximum value during labour*
* ***17%*** *↓ in STC ,with in 24hrs PP*
* ***9%*** *↑ in LDL , maximum value during labour*
* ***20%*** *↓ in LDL , with in 24hrs PP*
* ***11%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 6*

*Patient - Gomti*
*25yrs*

* *$G_3P_3L_3$*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Convulsions for 2 days***
* ***Paedal oedema present***
* *BP **140/110** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ Premature Vaginal delivery female baby*
*wt 2.5 kg*

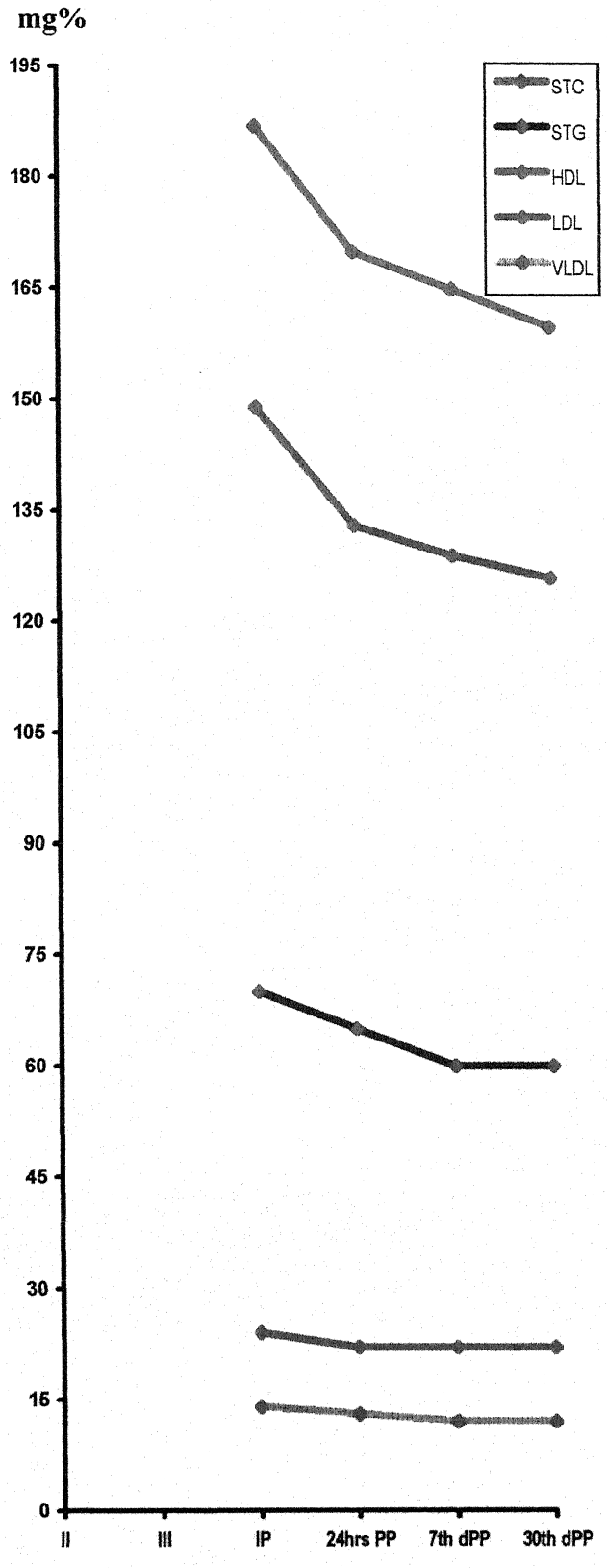
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 192 | 200 | - | 180 | 170 |
| STG | - | 91 | 84 | - | 80 | 78 |
| HDL | - | 36 | 32 | - | 34 | 32 |
| LDL | - | 150.8 | 151.2 | - | 130 | 122.4 |
| VLDL | - | 18.2 | 16.8 | - | 16 | 15.6 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***5%*** *↑ in STC, maximum value during labour*
* *minimal ↑ in LDL , maximum value during labour*
* ***10%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 7*

*Patient - Mala*
*23yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Vegetarian*
* ***C/o Swelling over feet & convulsions***
* ***Paedal oedema present***
* *BP **160/110** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ F.T.N.D, female baby wt 2.4 kg*

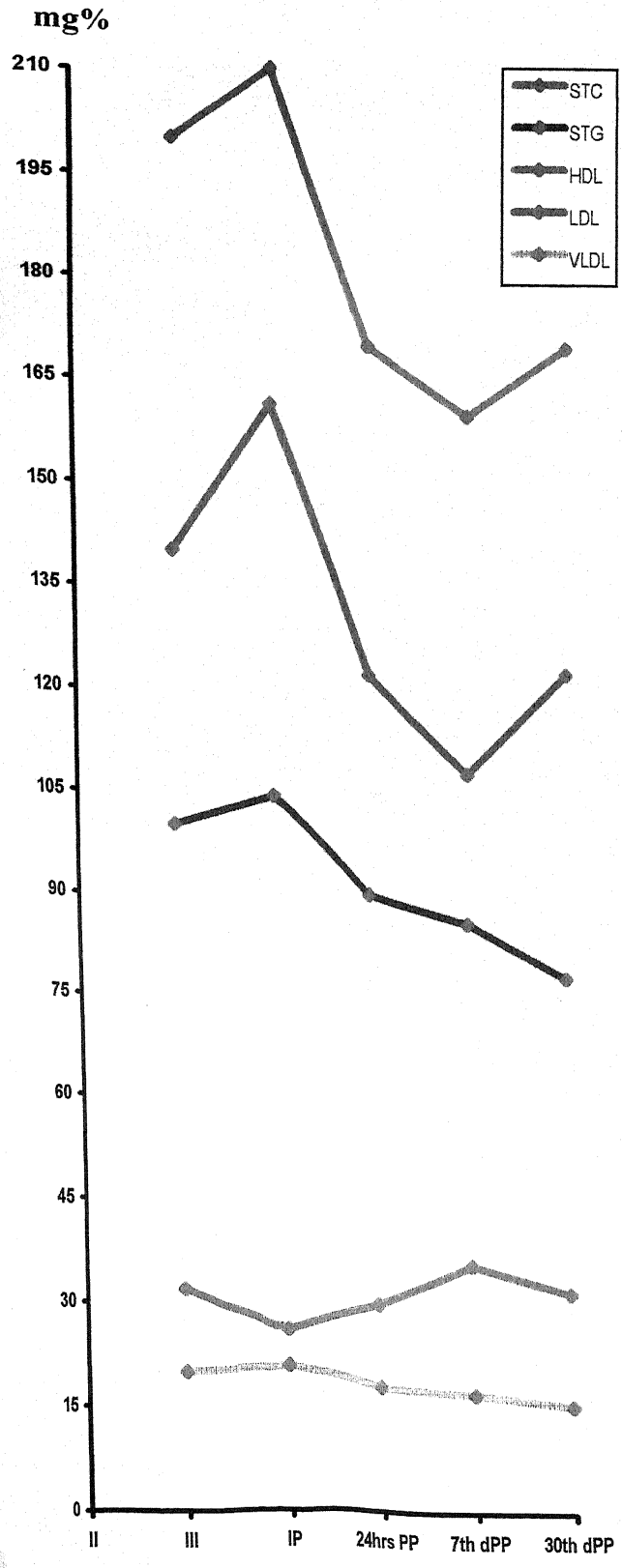
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | - | 187 | 170 | 165 | 160 |
| STG | - | - | 70 | 65 | 60 | 60 |
| HDL | - | - | 24 | 22 | 22 | 22 |
| LDL | - | - | 149 | 133 | 129 | 126 |
| VLDL | - | - | 14 | 13 | 12 | 12 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***9%*** *↓ in STC ,with in 24hrs PP*
* ***15%*** *↓ in LDL , with in 24hrs PP*
* ***10%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 8*

*Patient - Geeta*
*18yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Vegetarian*
* ***C/o Convulsions for 2 days & Blurring of Vision***
* *BP **140/100** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ Forceps delivery of female baby by Vertex , wt 2.8 kg*

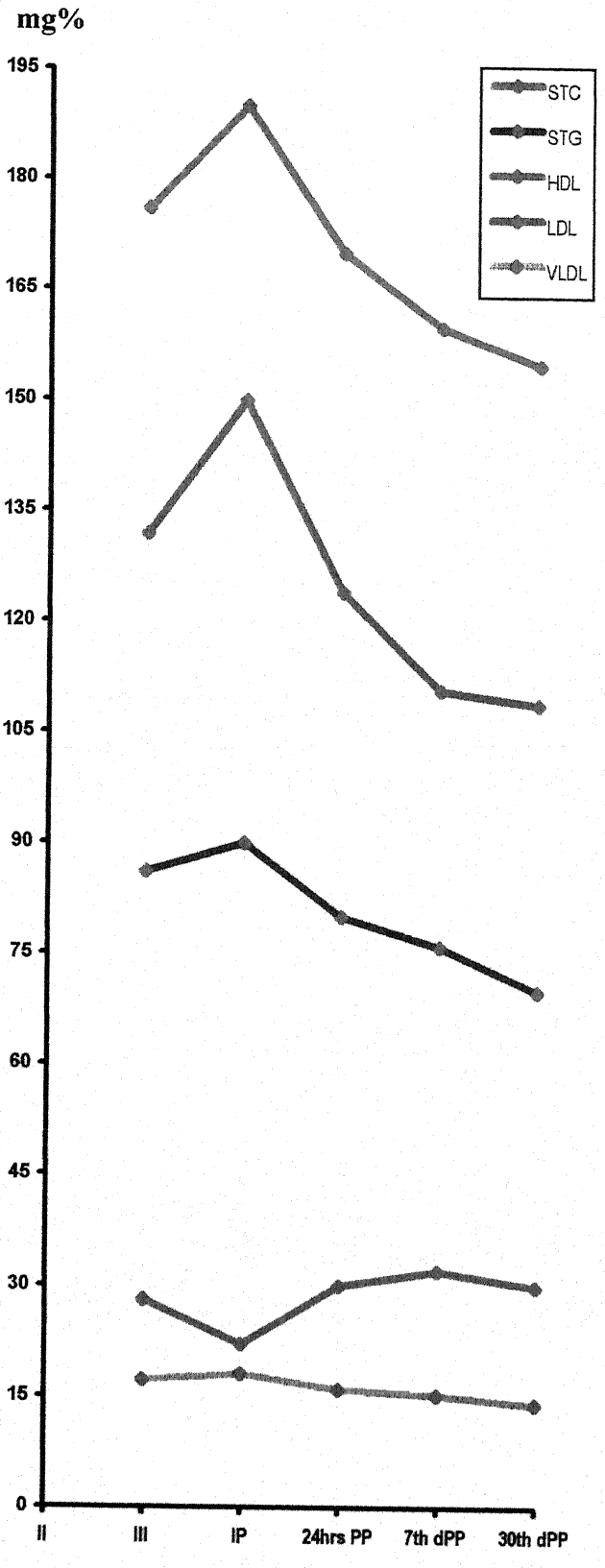
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 200 | 210 | 170 | 160 | - |
| STG | - | 100 | 104 | 90 | 86 | - |
| HDL | - | 32 | 26 | 30 | 36 | - |
| LDL | - | 148 | 161.8 | 122 | 107.8 | - |
| VLDL | - | 20 | 20.8 | 18 | 17.2 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***5%*** *↑ in STC, maximum value during labour*
* ***20%*** *↓ in STC , with in 24hrs PP*
* ***9%*** *↑ in LDL , maximum value during labour*
* ***21%*** *↓ in LDL , with in 24hrs PP*
* ***18%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 9*

*Patient - Rajkumari*
*25yrs*

* *G2P1L1*
* *Middle Socioeconomic Status*
* *Non Vegetarian*
* ***C/o Convulsions for one day***
* ***Paedal oedema present***
* *BP **160/120** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒premature Vaginal delivery female baby,wt 2.0 kg*

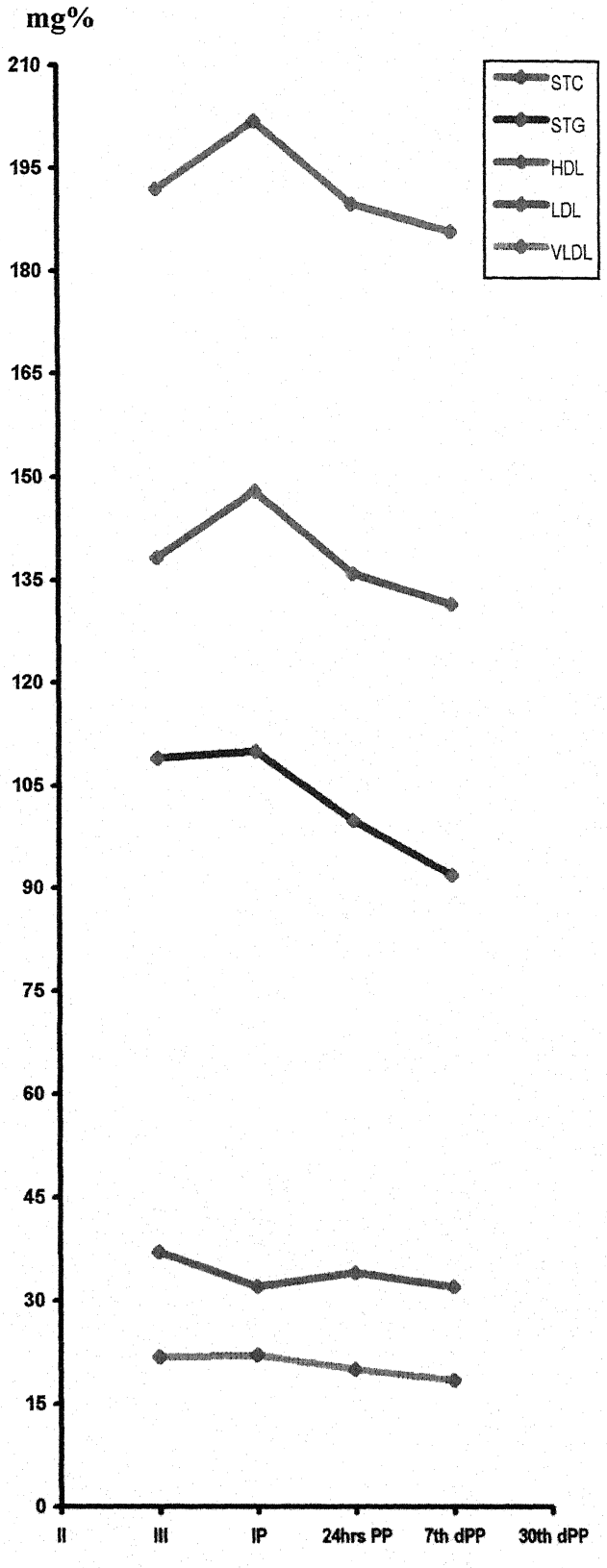
*Values mg%*

| | | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|---|
| STC | - | | 176 | 190 | 170 | 160 | 155 |
| STG | - | | 86 | 90 | 80 | 76 | 70 |
| HDL | - | | 28 | 22 | 30 | 32 | 30 |
| LDL | - | | 131.8 | 150 | 124 | 110.8 | 101 |
| VLDL | - | | 17.2 | 18 | 16 | 15.2 | 14 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***8%↑** in STC , maximum value during labour*
* ***12%↓** in STC ,with in 24hrs PP*
* ***17%↑ in** LDL, maximum value during labour*
* ***18%↓** in LDL , with in 24hrs PP*
* ***27%↓** in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 10*

*Patient - Susheela*
*26yrs*

* *G3P3L3*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Swelling over feet & convulsions one day back***
* *BP **190/100** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ F.T.N.D, female baby wt 2.8 kg*

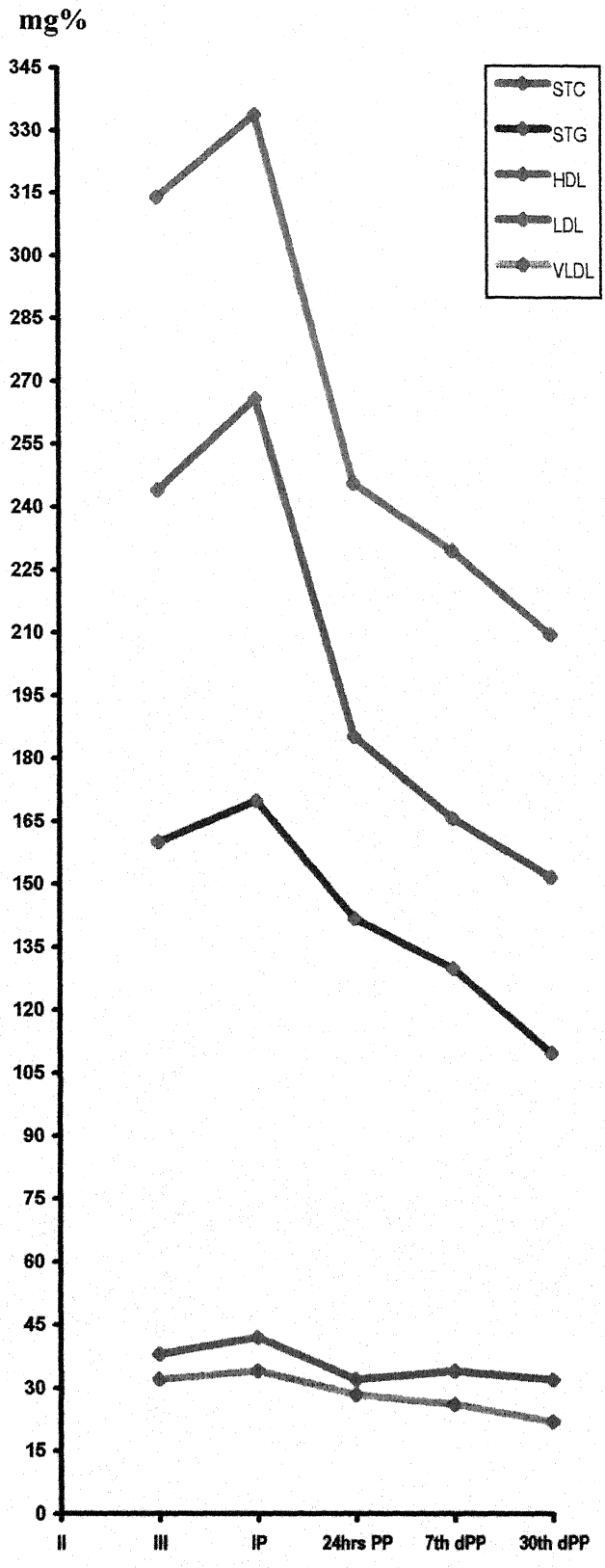
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 192 | 202 | 190 | 186 | - |
| STG | - | 109 | 110 | 100 | 92 | - |
| HDL | - | 37 | 32 | 34 | 32 | - |
| LDL | - | 138.2 | 148 | 136 | 131.6 | - |
| VLDL | - | 21.8 | 22 | 20 | 18.4 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***6%↑** in STC, maximum value during labour*
* ***7%↓** in STC , with in 24hrs PP*
* ***8%↑** in LDL , maximum value during labour*
* ***9%↓** in LDL , with in 24hrs PP*
* ***11%↓** in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 11*

*Patient - Madhu*
*18yrs*

* *Primi Gravida*
* *Upper Socioeconomic Status*
* *Non Vegetarian*
* ***C/o Unconscious during admission***
* ***Paedal oedema present***
* *BP **160/110** mm Hg*
* *Urine - **Protein present***
* *LFT Normal & RFT Impaired Deveoloped renal failure*
* *Out come⇒ Spontanious expulsions of dead male baby*

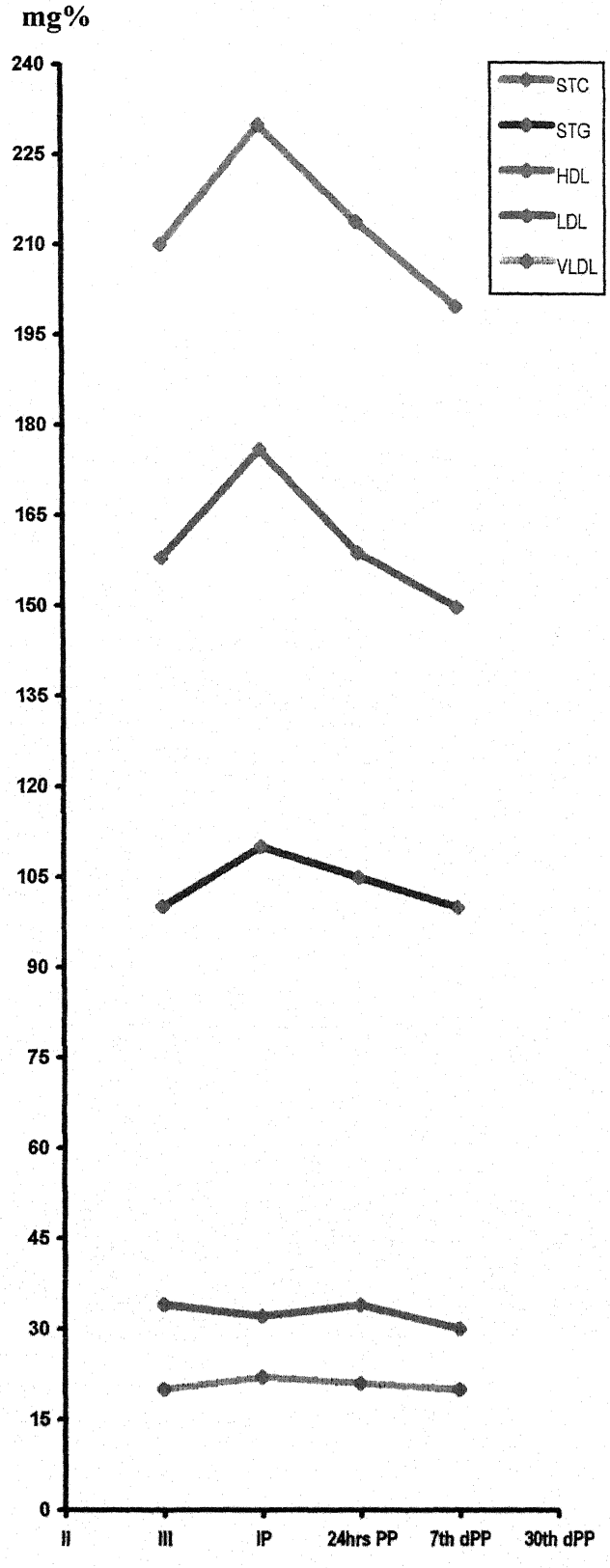
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 314 | 334 | 246 | 230 | 210 |
| STG | - | 160 | 170 | 142 | 130 | 110 |
| HDL | - | 38 | 34 | 32 | 34 | 32 |
| LDL | - | 244 | 266 | 185.6 | 166 | 152 |
| VLDL | - | 32 | 34 | 28.4 | 26 | 22 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *8%↑ in STC , maximum value during labour*
* ***27%*** *↓ in STC ,with in 24hrs PP*
* ***7%↑ in*** *LDL, maximum value during labour*
* ***30%*** *↓ in LDL , with in 24hrs PP*
* ***10%*** *↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 12*

*Patient - Pawan Kumari*
*21yrs*

* *Primi Gravida*
* *lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Unconscious during admission***
* ***Paedal oedema present***
* *BP **148/96** mm Hg*
* *Urine - **Protein present***
* *LFT Normal & RFT Impaired*
  *Deveoloped renal failure*
* *Out come⇒ F.T.N.D, female baby*
  *wt. 2.4 kg*

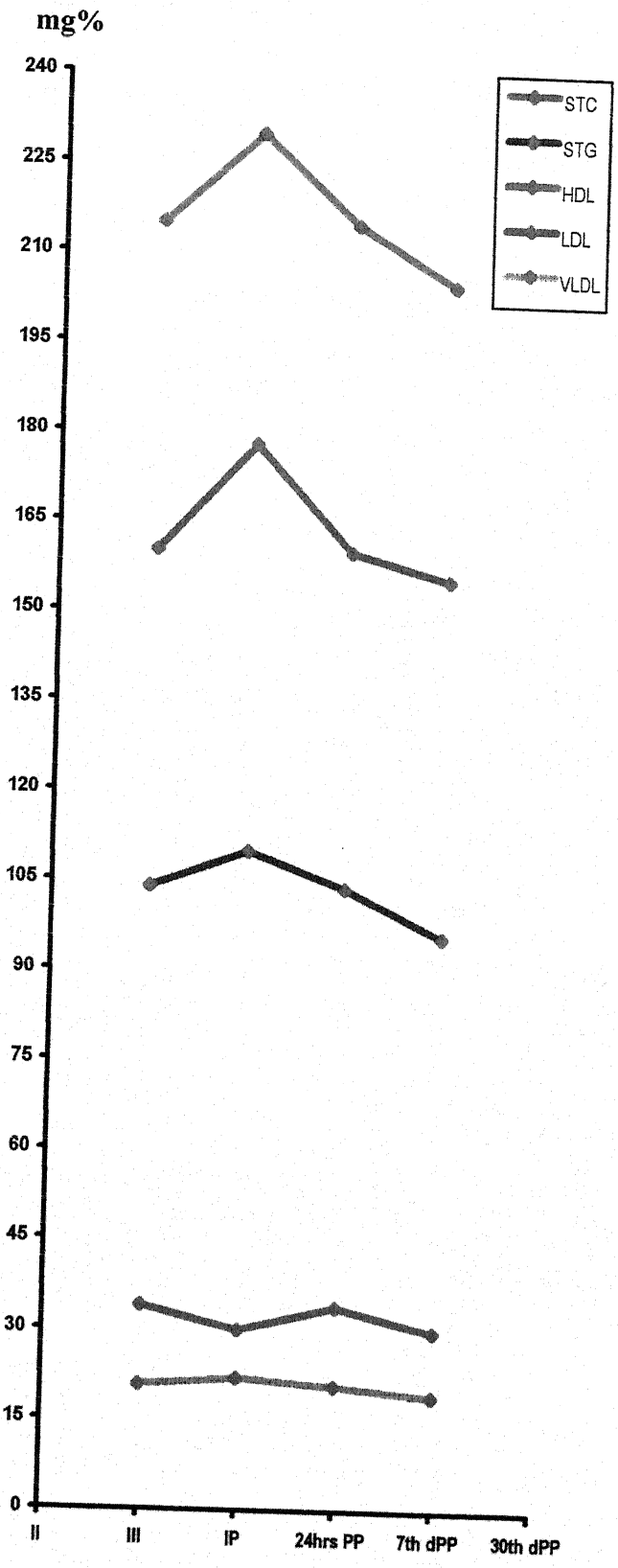
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 210 | 230 | 214 | 200 | - |
| STG | - | 100 | 110 | 105 | 100 | - |
| HDL | - | 34 | 32 | 34 | 30 | - |
| LDL | - | 158 | 176 | 159 | 150 | - |
| VLDL | - | 20 | 22 | 21 | 20 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***10%↑** in STC , peak during labour*
* ***7% ↓** in STC ,with in 24hrs PP*
* ***14%↑ in** LDL, peak during labour*
* ***10% ↓** in LDL , with in 24hrs PP*
* ***5% ↓** in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 13*

*Patient - Raj kumari*
*26yrs*

* *G2P2L2*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Convulsious for one day***
* ***Paedal oedema present***
* *BP **160/96** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ F.T.N.D, female baby wt 2.7 kg*

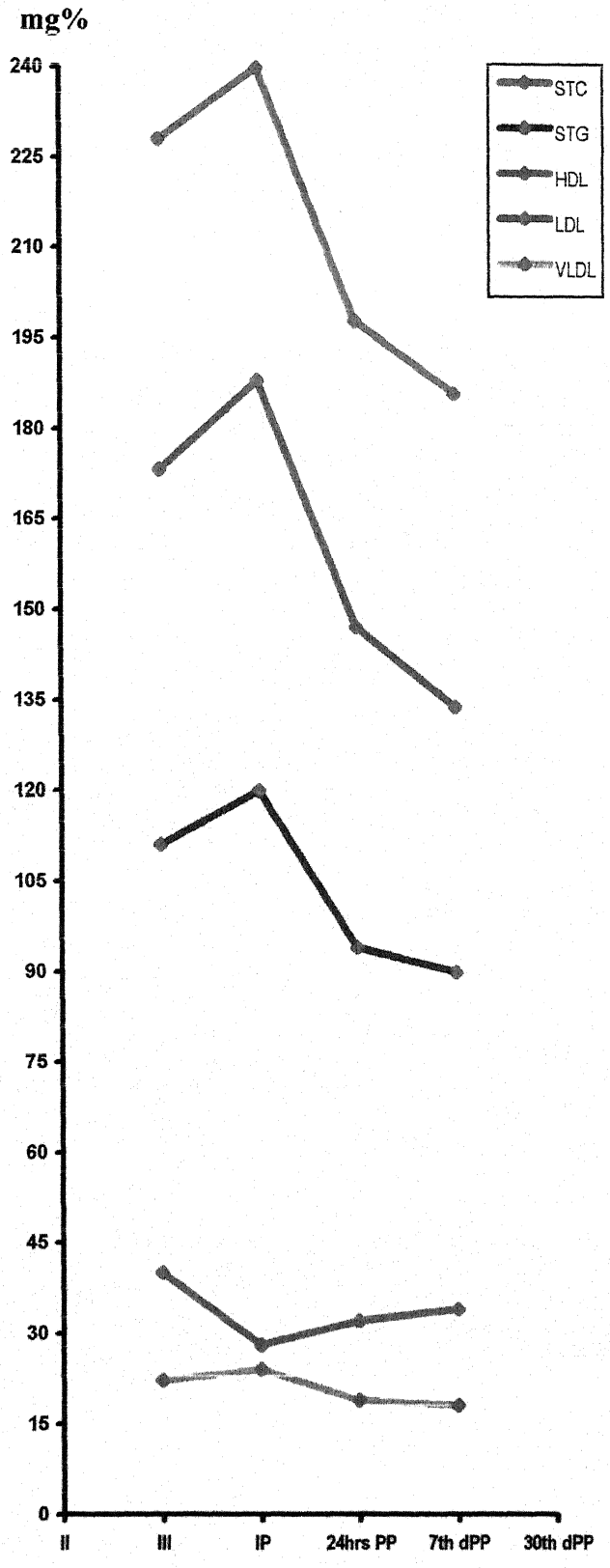
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 215 | 230 | 215 | 205 | - |
| STG | - | 104 | 110 | 104 | 96 | - |
| HDL | - | 34 | 30 | 34 | 30 | - |
| LDL | - | 160.2 | 178 | 160.2 | 147.8 | - |
| VLDL | - | 20.8 | 22 | 20.8 | 19.2 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***7%↑** in STC , peak during labour*
* ***6%↓** in STC ,with in 24hrs PP*
* ***12%↑ in** LDL, peak during labour*
* ***12%↓** in LDL , with in 24hrs PP*
* ***11%↓** in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 14*

*Patient - Kunwar bai*
*20yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Unconscious during admission***
* ***Paedal oedema present***
* *BP **180/100** mm Hg*
* *Urine - **Protein present***
* *LFT & RFT Normal*
* *Out come⇒ Forcep delivery of still female baby*

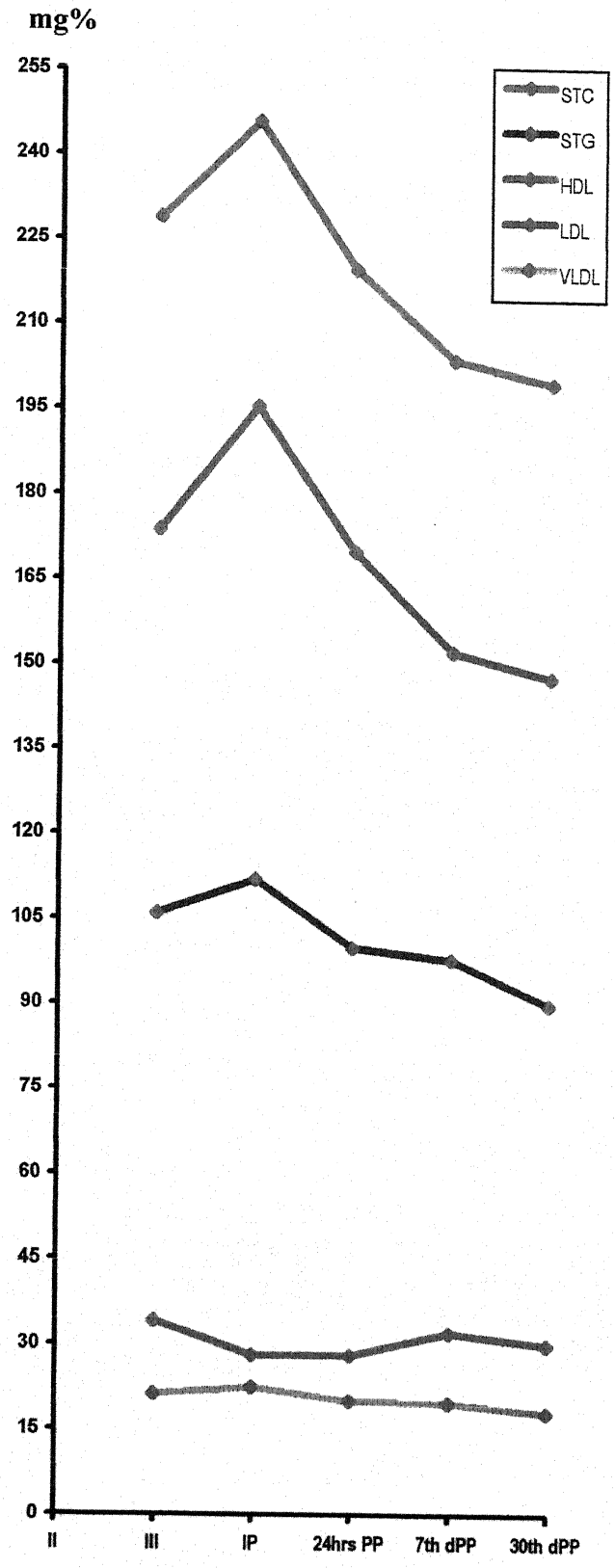
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 228 | 240 | 198 | 186 | - |
| STG | - | 111 | 120 | 94 | 90 | - |
| HDL | - | 32 | 28 | 32 | 34 | - |
| LDL | - | 173.2 | 188 | 147.2 | 134 | - |
| VLDL | - | 22.2 | 24 | 18.8 | 18 | |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***7%↑** in STC , peak during labour*
* ***20%↓** in STC ,with in 24hrs PP*
* ***9%↑ in** LDL, peak during labour*
* ***22%↓** in LDL , with in 24hrs PP*
* ***12%↓** in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 15*

*Patient - Angoori*
*24yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Convulsious for one day***
* ***Oedema over feet present***
* *BP **150/100** mm Hg*
* *Urine - **Protein present***
* *LFT Impaired & RFT Normal*
* *Out come⇒ Spontaneous expulsion of full term dead male foetus*

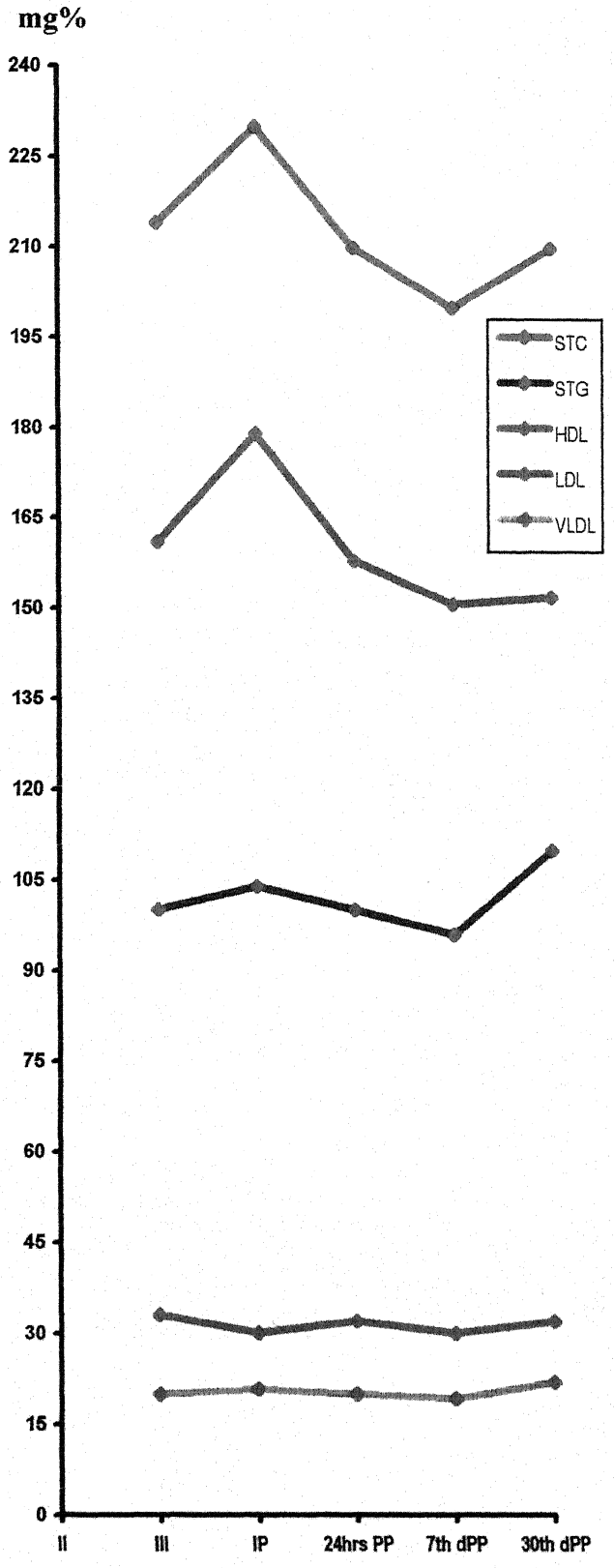
*Values mg%*

| | | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|---|
| STC | - | | 229 | 246 | 220 | 204 | 200 |
| STG | - | | 106 | 112 | 100 | 98 | 90 |
| HDL | - | | 34 | 28 | 28 | 32 | 30 |
| LDL | - | | 173.8 | 195.6 | 170 | 152.4 | 148 |
| VLDL | - | | 21.2 | 22.4 | 20 | 19.6 | 18 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* *8%↑ in STC , peak during labour*
* *11% ↓ in STC ,with in 24hrs PP*
* *12%↑ in LDL, peak during labour*
* *14% ↓ in LDL , with in 24hrs PP*
* *17% ↓ in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 16*

*Patient - Jareena*
*21yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Non Vegetarian*
* ***C/o Convulsions for six hrs***
* *Paedal oedema absent*
* *BP **140/100** mm Hg*
* *Urine - **Protein present***
* *LFT Normal & RFT Impaired*
  *Deveoloped renal failure*
* *Out come⇒ F.T.N.D, female baby*
  *wt.2.6 kg*

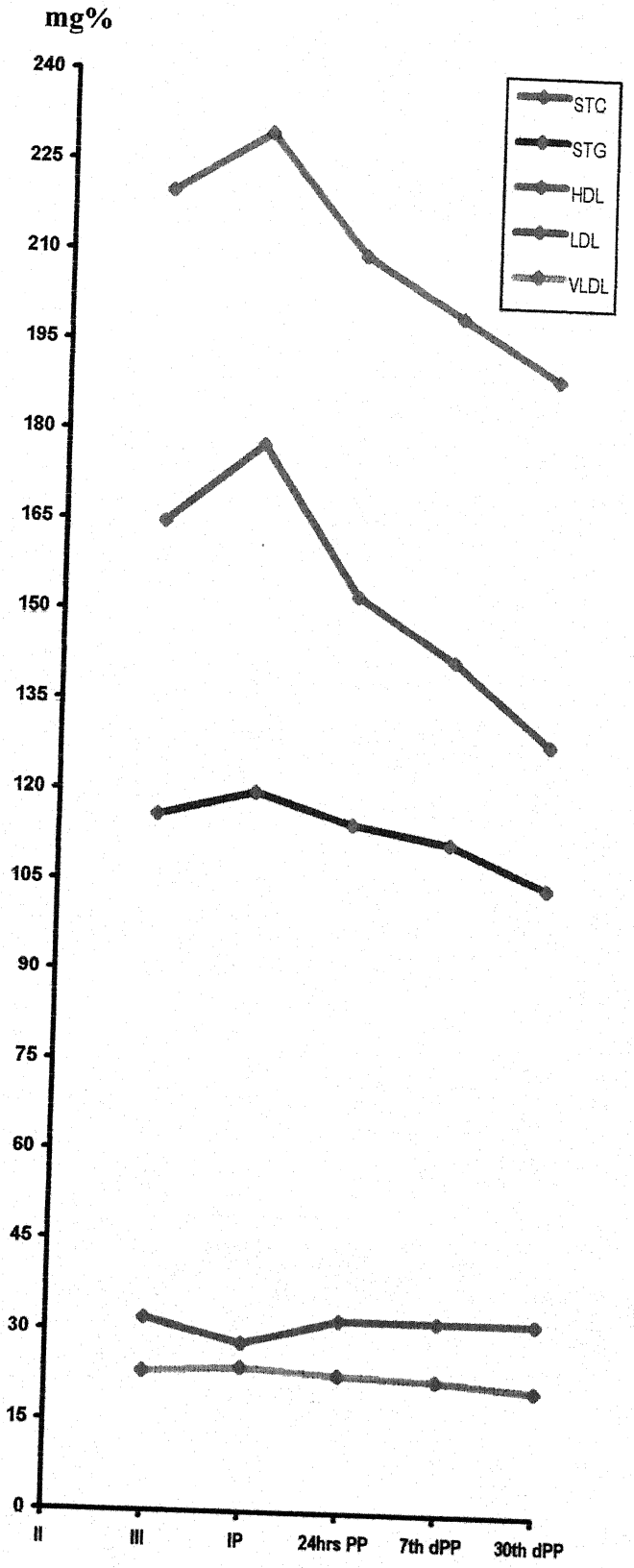
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 214 | 230 | 210 | 200 | - |
| STG | - | 100 | 104 | 100 | 96 | - |
| HDL | - | 33 | 30 | 32 | 30 | - |
| LDL | - | 161 | 179 | 158 | 150.8 | - |
| VLDL | - | 20 | 20.8 | 20 | 19.2 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***7.5%*** *↑in STC , maximum value during labour*
* ***9%*** *↓in STC ,with in 24hrs PP*
* ***11%↑ in*** *LDL, maximum value during labour*
* ***12%*** *↓in LDL , with in 24hrs PP*
* ***9%*** *↓in HDL , up to labour*




## ECLAMPSIA GROUP

*Case no 17*

*Patient - Premwati*
*26yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Vegetarian*
* ***C/o Unconscious during admission***
* *BP **150/106** mm Hg*
* *Urine - **Protein present***
* *LFT Normal & RFT Impaired*
* *Out come⇒ F.T.N.D, male baby wt 2.4 kg*

*Values mg%*

| | | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|---|
| STC | - | | 220 | 230 | 210 | 200 | 190 |
| STG | - | | 116 | 120 | 115 | 112 | 105 |
| HDL | - | | 32 | 28 | 32 | 32 | 32 |
| LDL | - | | 164.8 | 178 | 153 | 142.6 | 129 |
| VLDL | - | | 23.2 | 24 | 23 | 22.4 | 21 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***5%↑** in STC , peak during labour*
* ***9% ↓** in STC ,with in 24hrs PP*
* ***10%↑ in** LDL, peak during labour*
* ***12% ↓** in LDL , with in 24hrs PP*
* ***12% ↓** in HDL , up to labour*

## TABLE VIII
## Showing serum lipoprotein profile in eclamptic patients with still birth

| | IInd trimester | IIIrd trimester | IP period | 1st post partum day | 7th post partum day | 30th post partum day |
|---|---|---|---|---|---|---|
| STC mg % Mean ± SD | --- | 251.8±42.78 | 278.0±39.2 | 236.8±34.45 | 222.0±31.59 | 205±7.0 |
| STG mg % Mean ± SD | --- | 1.31.2 ± 23.59 | 142.4 ± 25.27 | 118.8 ± 20.67 | 113.5 ± 22.24 | 100±14.14 |
| HDL mg % Mean ± SD | --- | 33.6± 4.5 | 28.8± 4.6 | 30± 5.16 | 30± 5.09 | 31± 4.1 |
| LDL mg% mean ± SD | --- | 192.8± 58.72 | 220± 31.72 | 183± 29.51 | 173.6± 31.09 | 150 ± 10 |
| VLDL mg % mean± SD | --- | 26.2± 4.72 | 28.4± 6.81 | 24.4± 4.72 | 22.6± 5.02 | 20± 2.8 |
| no of cases (n) | --- | 5 | 5 | 5 | 5 | 2 |

Table VIII shows that STC raised from 251.8 ± 42.78 at 3rd trimester to 278 ± 39.2 at IP period and then declined to 236.8 ± 34.45 at 1st PP day and 222.0 ± 31.59 at 7th PP day reaching to 205 ± 7 at 30th PP day

| | |
|---|---|
| III VS IP | $p < .05$ |
| IP Vs 1st PP day | $p < .05$ |
| IP Vs 7th PP day | $p < .001$ |

Similarly LDL raised from 192.8 ± 58.72 to 220 ± 31.72 at IP period which declined to 183 at 1st PP day and 173.6 ± 31.09 at 7th PP day

| | |
|---|---|
| III Vs IP | $p < .001$ |
| IP Vs 1st PP day | $p < .001$ |
| IP Vs 7th PP day | $p < .001$ |

HDL decreased from 33.6 ± 4.3 to 28.8 ± 4.6 at labour then raised to 31 ± 1 at 30th PP day

| | |
|---|---|
| III Vs IP | $p < .001$ |
| IP Vs 1st PP day | $p > .05$ |
| IP Vs 7th PP day | $p > .05$ |

STG and VLDL raised from IIIrd trimester and reached to peak during labour , declined afterwards

## TABLE IX
## Serum Lipoprotein profile in relation to parity in cases of eclampsia

| | Parity | II trimester | IIItrimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|---|
| STC mg % mean±SD | Primi | - | 228.5± 40.36 | 239± 43.71 | 210.9± 34.93 | 202± 31.3 | 190± 21.6 |
| | Multi | - | 205.8± 34.05 | 226.33± 35.03 | 205.2± 24.5 | 196.66± 26.62 | 162± 20.2 |
| LDL mg % mean±SD | Primi | - | 172.4± 34 | 186.72± 35.03 | 159.63± 29.66 | 149.3± 26 | 138.75± 46.74 |
| | Multi | - | 154.16± 19.8 | 174.6± 30.2 | 153.4± 23.66 | 146.5± 26,73 | 115.5± 9.2 |
| HDL mg % mean±SD | Primi | - | 33.1± 3.03 | 28.9± 9.64 | 30.7± 3.32 | 31`± 11.7 | 29± 4.76 |
| | Multi | - | 34.33± 4.35 | 28.5± 5.15 | 31.4± 4.58 | 30.33± 4.28 | 31± 1.4 |
| no of Cases | Primi | - | 10 | 11 | 11 | 10 | 4 |
| | Multi | | 6 | 6 | 5 | 6 | 2 |

Table IX shows that values of mean STC & mean LDL were higher during pregnancy , Labour and on 1st , 7th and 30th PP day in Primi Gravidae . In comparison to Multi Gravidae . But this difference was statistically not significant . HDL values were higher in Multi Gravidae during 3rd trimester and on 1st PP day and 30th PP day.

## TABLE X

## SerumLipoproteins in eclamptic patients with un consciousness

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg % mean ± SD | - | 244.2± 40.21 | 267± 36.2 | 230± 32.2 | 220± 31.8 | 200± 10.1 |
| STG mg % mean ± SD | - | 127.14± 23.27 | 137.14± 25.2 | 118.71± 21.2 | 112.85± 19.28 | 107.5± 16.2 |
| HDLmg % mean ± SD | - | 33.85± 4.2 | 29.42± 4.4 | 31.37± 4.1 | 33.14± 4.1 | 32± 2.1 |
| LDL mg % mean ± SD | - | 184.85± 42.6 | 208.7± 36.71 | 174.7± 30.8 | 165± 31.2 | 140± 7.8 |
| VLDL mg % mean ± SD | - | 26.14± 4.82 | 28± 6.2 | 23.85± 6.21 | 24± 4.71 | 21.5± 3.2 |
| no of Cases | - | 7 | 7 | 7 | 7 | 2 |

Table X shows that STC value was 244.2 ± 40.21 during III trimester then raised to 267 ± 36.2 during labour and declined to 230 ± 32.2 at 1st PP day . 220 ± 31.8 at 7th PP day reaching to 200 ± 10.1 at 30th post partum day.

| | |
|---|---|
| III Vs IP | p < .001 |
| III Vs 1st PP day | P < .001 |
| III Vs 7th PP day | p < .001 |
| 1st PP day Vs 7th Pp day | p < .001 |

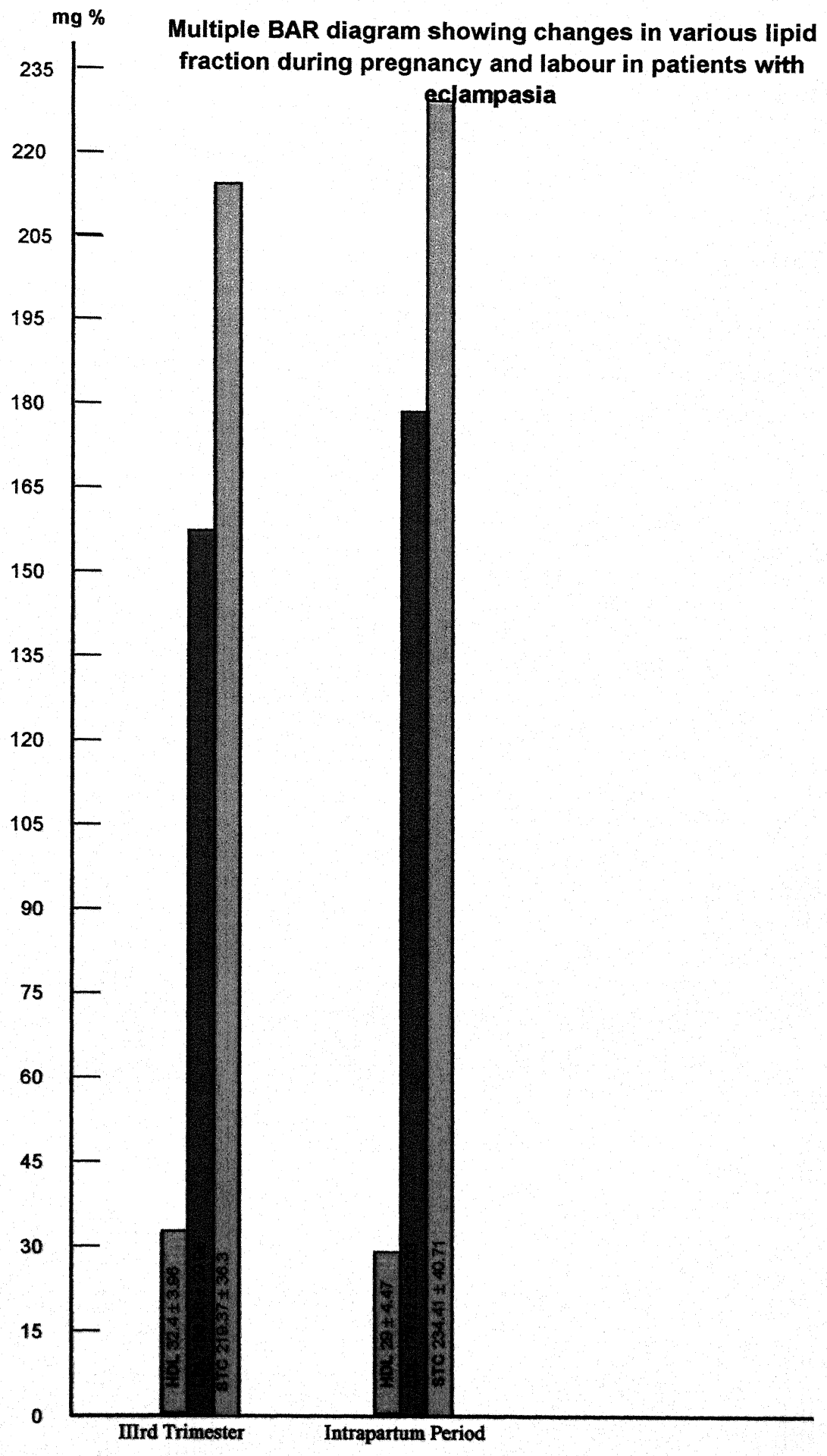
LDL raised from 184.85 ± 42.6 to 208.7 ± 36.71 at labour , then decreased to 140.0 ± 7.8 at 30th PP day.

| | |
|---|---|
| III Vs IP | p < .05 |
| IP Vs 1st PP day | p < .001 |
| IP Vs 7th PP day | p < .001 |

HDL declined from 33.85 ± 4.2 to 29.42 ± 4.4 at labour , then raised to 33.14 ± 4.1 mg% at 7th PP day .

| | |
|---|---|
| III Vs IP | p < .001 |
| IP Vs 1st PP day | p > .05 |
| IP Vs 7th PP day | p < .001 |

**Multiple BAR diagram showing changes in various lipid fraction during pregnancy and labour in patients with eclampasia**



# TABLE XI

## Serum Lipoprotein Profile in cases of IUGR.

| | II trimester | III trimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| STC mg % mean ± SD | 168.44± 7.95 | 171.5± 9 | 176.9± 9.59 | 172.3± 9.2 | 168.6± 11.2 | 165.8± 10.83 |
| STG mg % mean ± SD | 87.88± 4.13 | 93± 6.23 | 97.2± 7.1 | 92.7± 5.62 | 89.6± 6.0 | 91± 4.29 |
| HDLmg % mean ± SD | 37.33± 1.9 | 33.9± 1.76 | 31.8± 1.94 | 32.4± 2.24 | 32.9± 2.86 | 32.83± 3.36 |
| LDL mg % mean ± SD | 113.53± 8 | 119± 8.6 | 125.4± 8.77 | 121.2± 8.24 | 117.8± 7.24 | 113± 9.83 |
| VLDL mg % mean ± SD | 17.52± 2.5 | 18.6± 2.4 | 19.44± 2.13 | 18.52± 2.2 | 17.9± 1.78 | 18.2± 2.6 |
| no of Cases | 9 | 10 | 10 | 10 | 10 | 6 |

Table XI shows that STC at 2nd trimester was 168.44 ± 7.95 , it raised minimally to 176.9 ± 9.59 during labour , rise was statistically not significantly , then it decreased to 165.63 ± 10.83 at 30th PP day

| | |
|---|---|
| III Vs IP | p > .05 |
| II Vs IP | p > .05 |
| II Vs III | p > .05 |
| IP Vs 1st PP day | p > .05 |
| IP Vs 7th PP day | P > .05 |
| IP Vs 30th PP day | p > .05 |

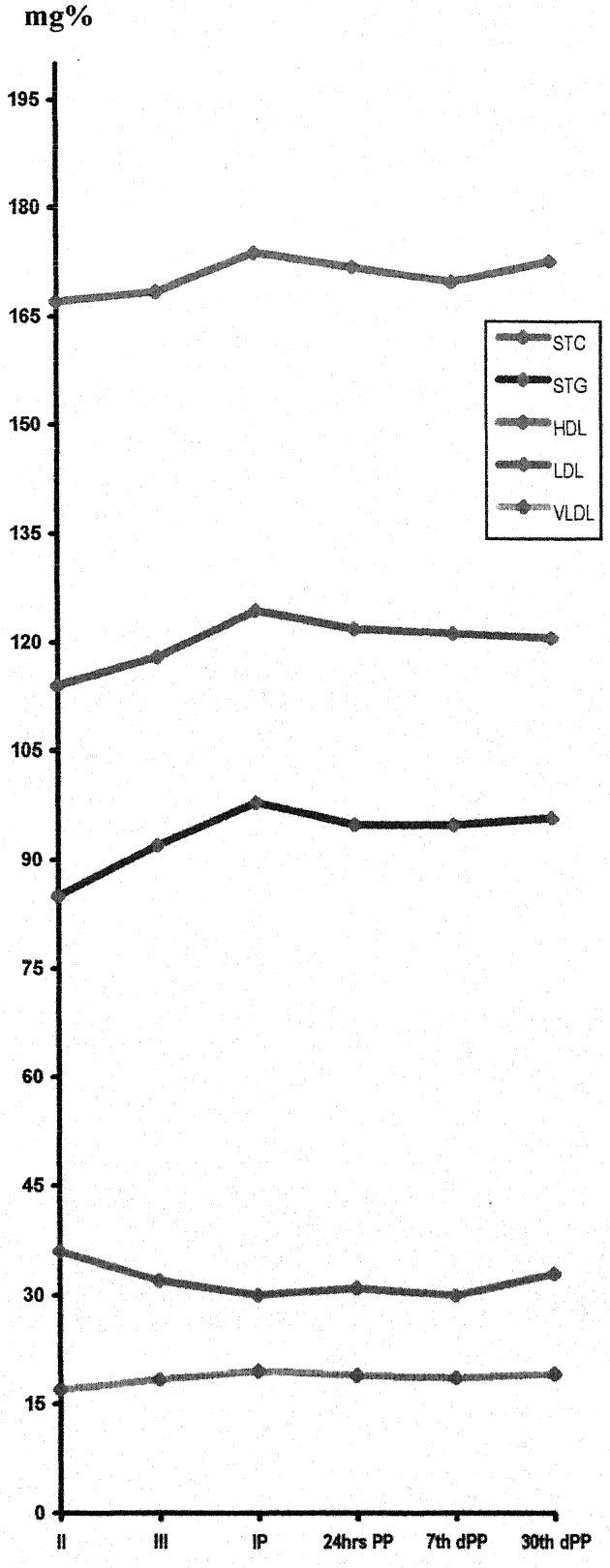
LDL raised minimally from 2nd trimester (113.5 ± 8.0) to 119.0 ± 8.67 at 3rd trimester and 125.4 ± 8.77 during labour , it decreased to 121.2 ± 8.24 on 1st PP day , 117.8 ± 7.24 mg % on day 7th

| | |
|---|---|
| II Vs III | p > .05 |
| III Vs IP | p > .05 |
| II Vs IP | p > .05 |
| IP Vs 1st PP day | p >.05 |
| IP Vs 7th PP day | p > .05 |
| IP Vs 30 th PP day | p > .05 |

HDL declined from 37.35 ± 1.9 to 33.9 ± 1.76 from 2nd trimester to 3rd trimester , it further decreased to 31.8 ±1.94 at labour . This fall was statistically significant then it raised to 32.83 ± 3.36 on the 30th day

| | |
|---|---|
| II Vs III | p <.05 |
| II Vs IP | p < .001 |

Similarly STG and VLDL raised from 2nd trimester to labour and declined therafter this rise was statistically not significant.




## I U G R GROUP

*Case no 1*

*Patient - Sunita*
*26yrs*

* *G5P4L3*
* *Middle Socioeconomic Status*
* *Vegetarian*
* ***C/o Failure to gain weight***
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing mod. to severe IUGR with Oligohydramnios*
* *Out come⇒ LSCS done due to foetal distress male baby wt 1.9 kg*

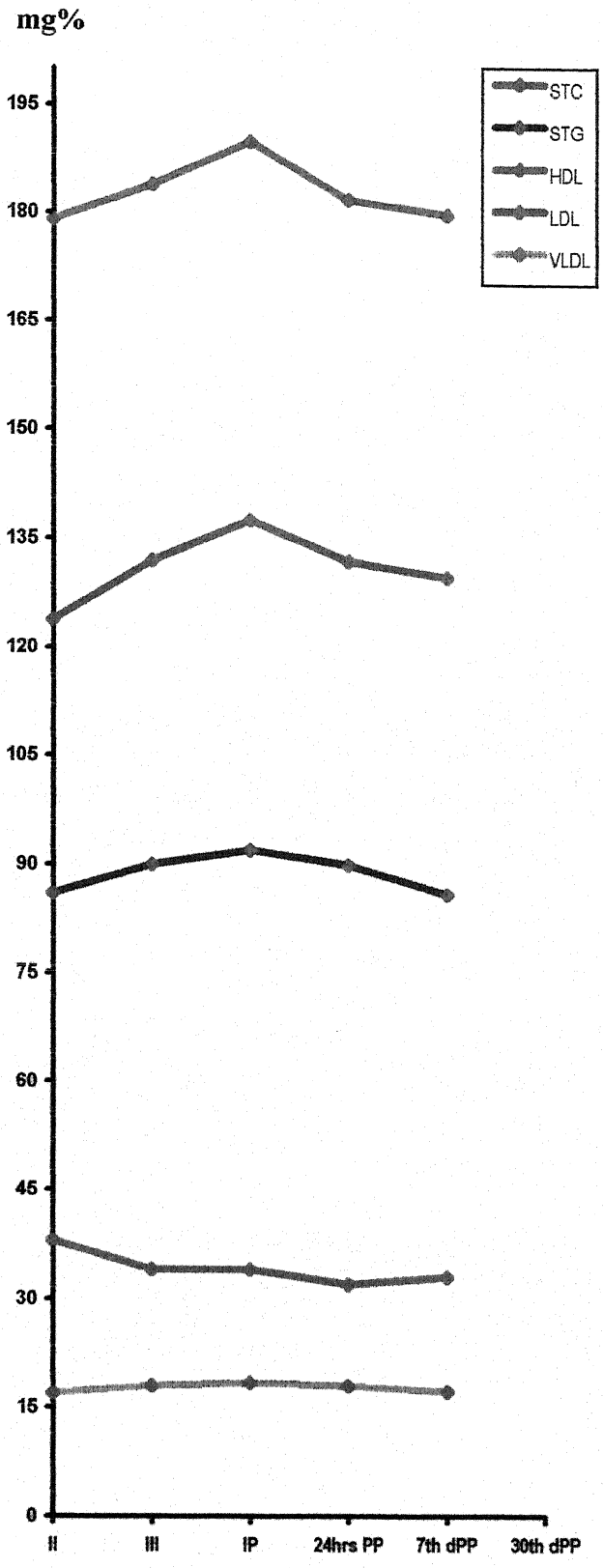
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 167 | 168.4 | 174 | 172 | 170 | 173 |
| STG | 85 | 92 | 98 | 95 | 93 | 96 |
| HDL | 36 | 32 | 30 | 31 | 30 | 33 |
| LDL | 114 | 118 | 124.4 | 122 | 121.4 | 120.8 |
| VLDL | 17 | 18.4 | 19.6 | 19 | 18.6 | 19.2 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***16%↓ in HDL** , up to labour*
* *slight↑ in STC, maximum value during labour*
* *8% ↑ in LDL , maximum value during labour*




## I U G R GROUP

*Case no 2*

*Patient - Sunita*
*24yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* ***C/o Swelling over body, weakness***
* *Fundal height does not corresponding to period of Amenorrhoea*
* *Hb. 4 gm% ,S.Proteins 3gm%*
* *USG - Showing mild IUGR*
* *Out come⇒ Premature Vaginal delivery female baby, wt 2.1 kg*

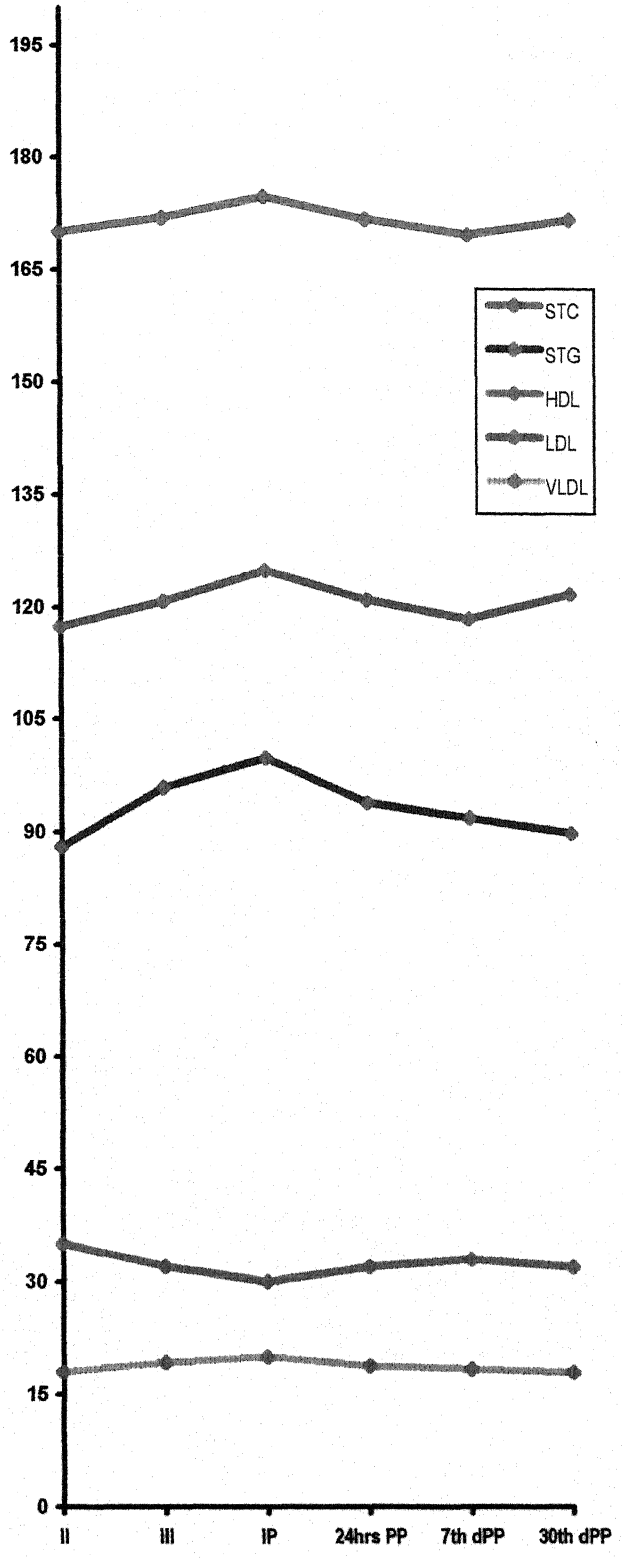
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 179 | 184 | 190 | 182 | 180 | - |
| STG | 86 | 90 | 92 | 90 | 86 | - |
| HDL | 38 | 34 | 34 | 32 | 33 | - |
| LDL | 124 | 132 | 137.6 | 132 | 129.8 | - |
| VLDL | 17 | 18 | 18.4 | 18 | 17.2 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***11%↓ in HDL** , up to labour*
* *5% ↑ in STC, maximum value during labour*
* ***11% ↑ in LDL** , maximum value during labour*




# I U G R GROUP

*Case no 3*

*Patient - Uma Verma*
*22yrs*

* *Primi Gravida*
* *Middle Socioeconomic Status*
* *Non Vegetarian*
* *Pt. Known case of systemic H.T without features of toxaemia*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing mod. to severe IUGR*
* *Out come⇒ LSCS done male baby wt 1.8 kg*

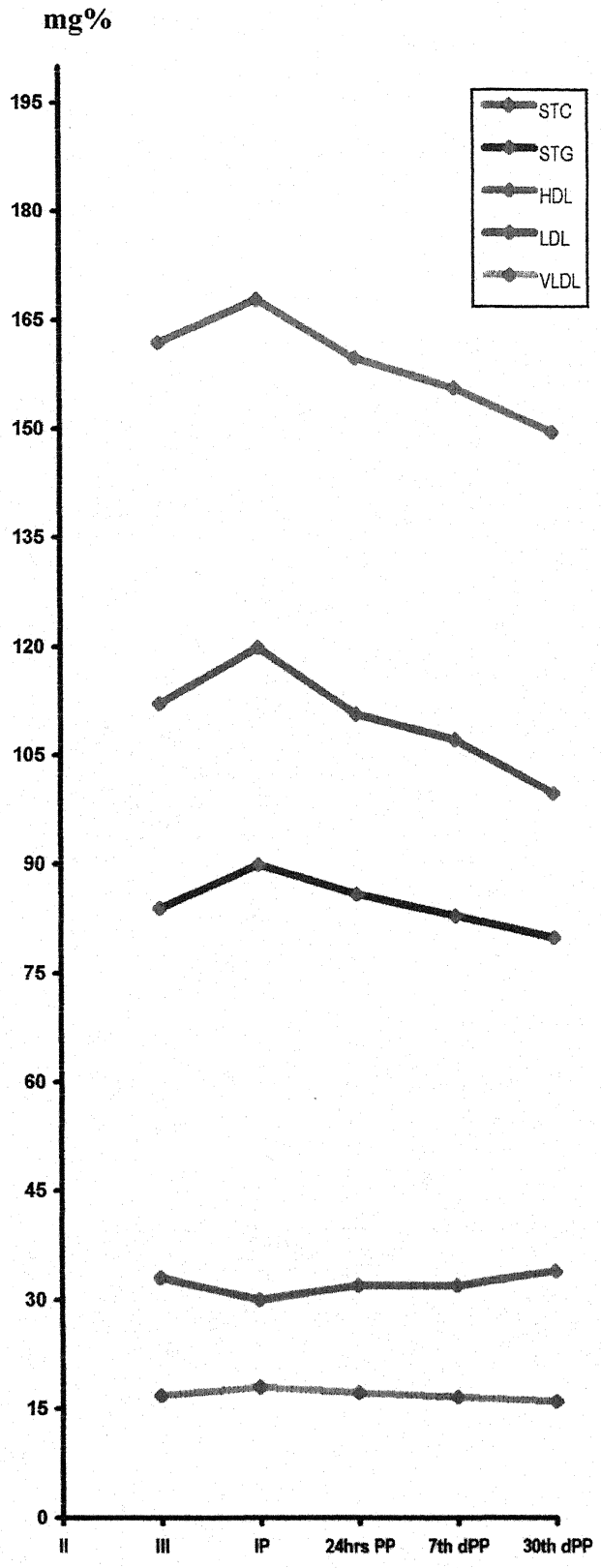
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 170 | 172 | 175 | 172 | 170 | 172 |
| STG | 88 | 96 | 100 | 94 | 92 | 90 |
| HDL | 35 | 32 | 30 | 32 | 33 | 32 |
| LDL | 117.4 | 120.8 | 125 | 121.2 | 118.6 | 122 |
| VLDL | 17.6 | 19.2 | 20 | 18.8 | 18.4 | 18 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***14%↓ in HDL**, up to labour*
* *slight ↑ in STC, maximum value during labour*
* ***6%** ↑ in LDL, maximum value during labour*




# I U G R GROUP

*Case no 4*

*Patient - Geeta Tewari*
*26yrs*

* *G4P3L3*
* *Middle Socioeconomic Status*
* *Vegetarian*
* *C/o Painless, recurrent vaginal bleeding*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing major degree of placenta praevia with mild IUGR*
* *Out come⇒ LSCS done male baby wt 2.3 kg*

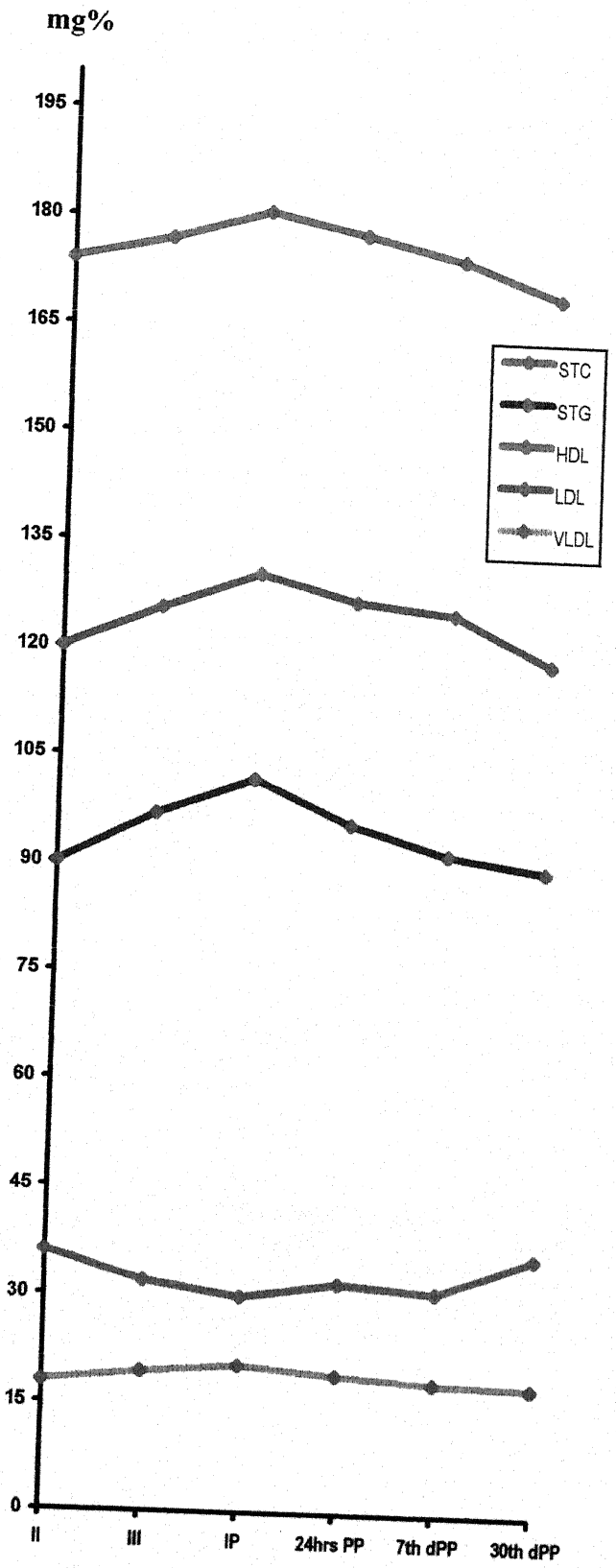
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | - | 162 | 168 | 160 | 156 | 150 |
| STG | - | 84 | 90 | 86 | 83 | 80 |
| HDL | - | 33 | 30 | 32 | 32 | 34 |
| LDL | - | 112.2 | 120 | 110.8 | 107.4 | 100 |
| VLDL | - | 16.8 | 18 | 17.2 | 16.6 | 16 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***9%↓ in HDL** , up to labour*
* *slight↑ in STC, maximum value during labour*
* *7% ↑ in LDL , maximum value during labour*




## I U G R GROUP

*Case no 5*

*Patient - Rekha*
*20yrs*

* *Primi Gravida*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *Detected on routine Antenatal checkup*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing severe degree of IUGR*
* *Complication aspiration pneumonitis*
* *Out come⇒ LSCS done after 38 weeks due to severity of IUGR female baby, wt 1.8 kg*

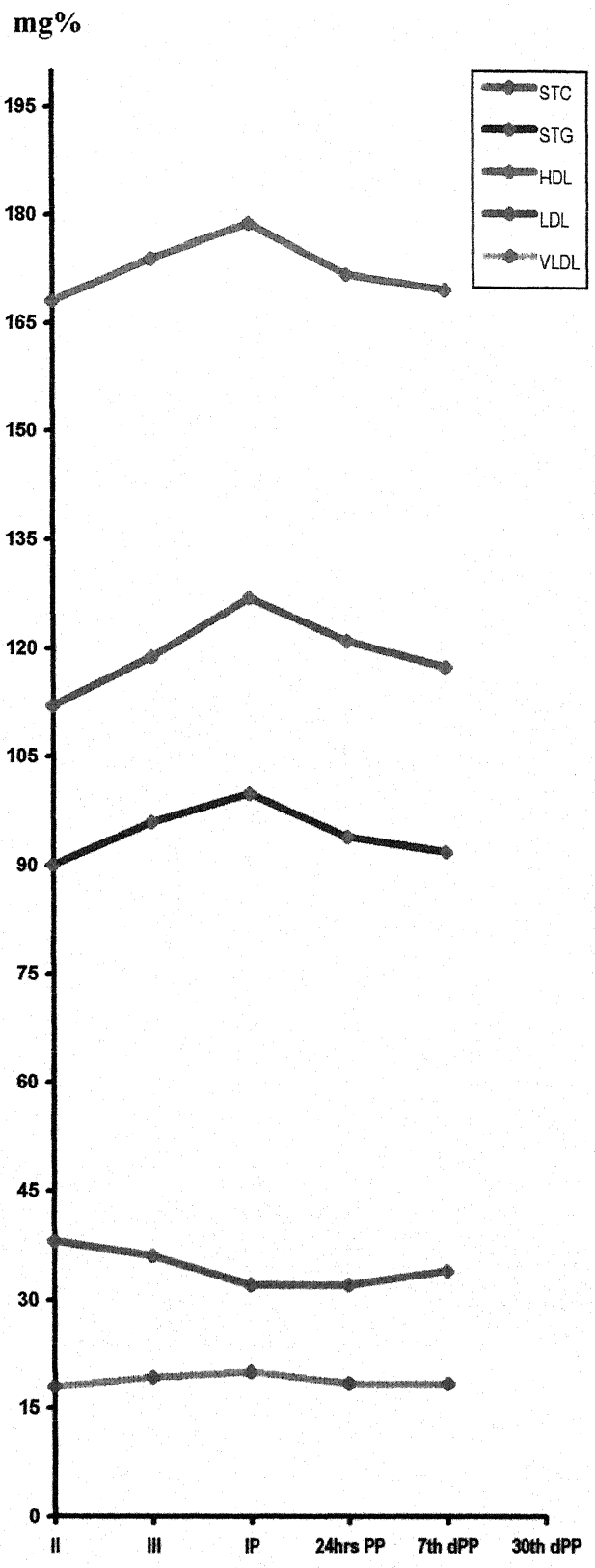
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 174 | 177 | 181 | 178.2 | 175 | 170 |
| STG | 90 | 97 | 102 | 96 | 92 | 90 |
| HDL | 36 | 32 | 30 | 32 | 31 | 33 |
| LDL | 120 | 125.6 | 130.6 | 127 | 125.6 | 119 |
| VLDL | 18 | 19.4 | 20.4 | 19.2 | 18.4 | 18 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***16.6%↓ in HDL**, up to labour*
* *slight↑ in STC, maximum value during labour*
* *8% ↑ in LDL, maximum value during labour*




## I U G R GROUP

*Case no 6*

*Patient - Kusum*
*25yrs*

* *G2 P2 L2*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *Detected on routine Antenatal checkup*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing evidence of mild IUGR with Small placenta*
* *Out come⇒ Premature vaginal delivery, female baby, wt 2.2 kg*

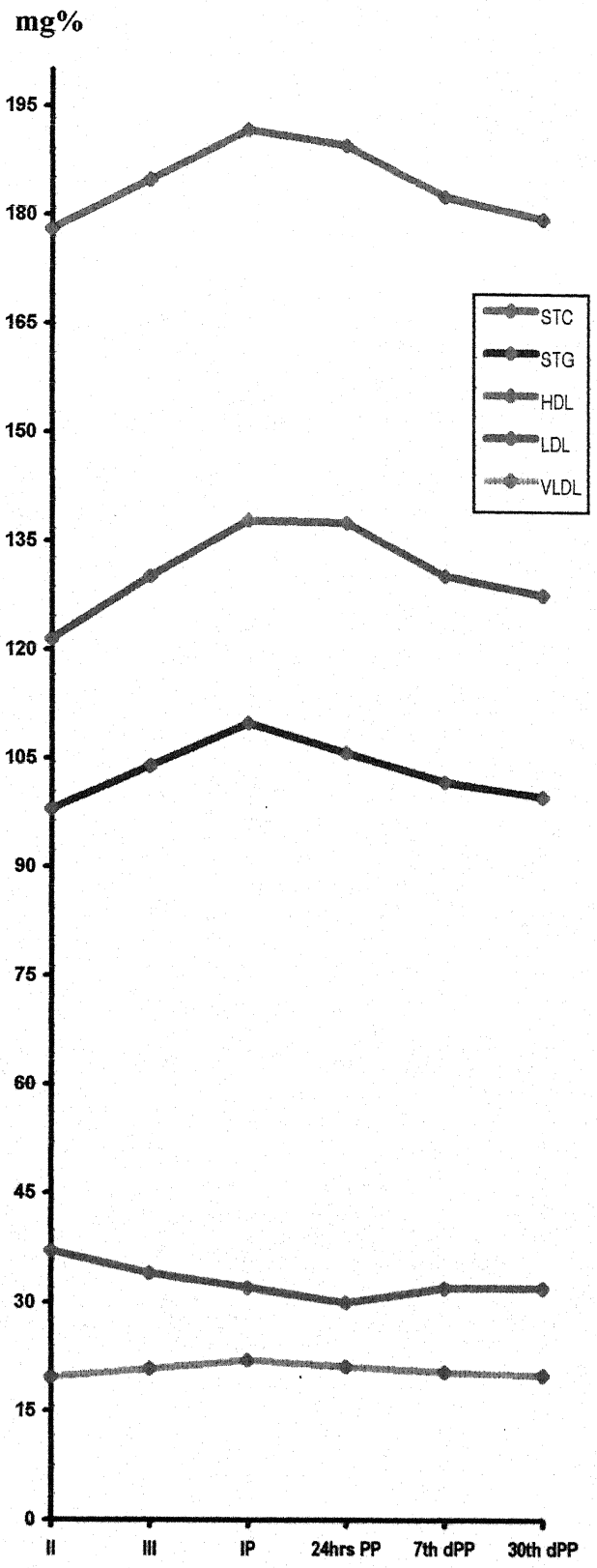
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 168 | 174 | 179 | 172 | 170 | - |
| STG | 90 | 96 | 100 | 94 | 92 | - |
| HDL | 38 | 36 | 32 | 32 | 34 | - |
| LDL | 112 | 118.8 | 127 | 121.2 | 117.6 | - |
| VLDL | 18 | 19.2 | 20 | 18.8 | 18.4 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***16%↓ in HDL** , up to labour*
* *6%↑ in STC, maximum value during labour*
* *10% ↑ in LDL , maximum value during labour*




## I U G R GROUP

*Case no 7*

*Patient - Kaushailya*
*26yrs*

* *G4 P3 L3*
* *Middle Socioeconomic Status*
* *Vegetarian*
* *C/o Failure to gain weight*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing evidence of mild IUGR with Oligohydramnios*
* *Out come⇒ F.T.N.D, male baby wt 2.2 kg*

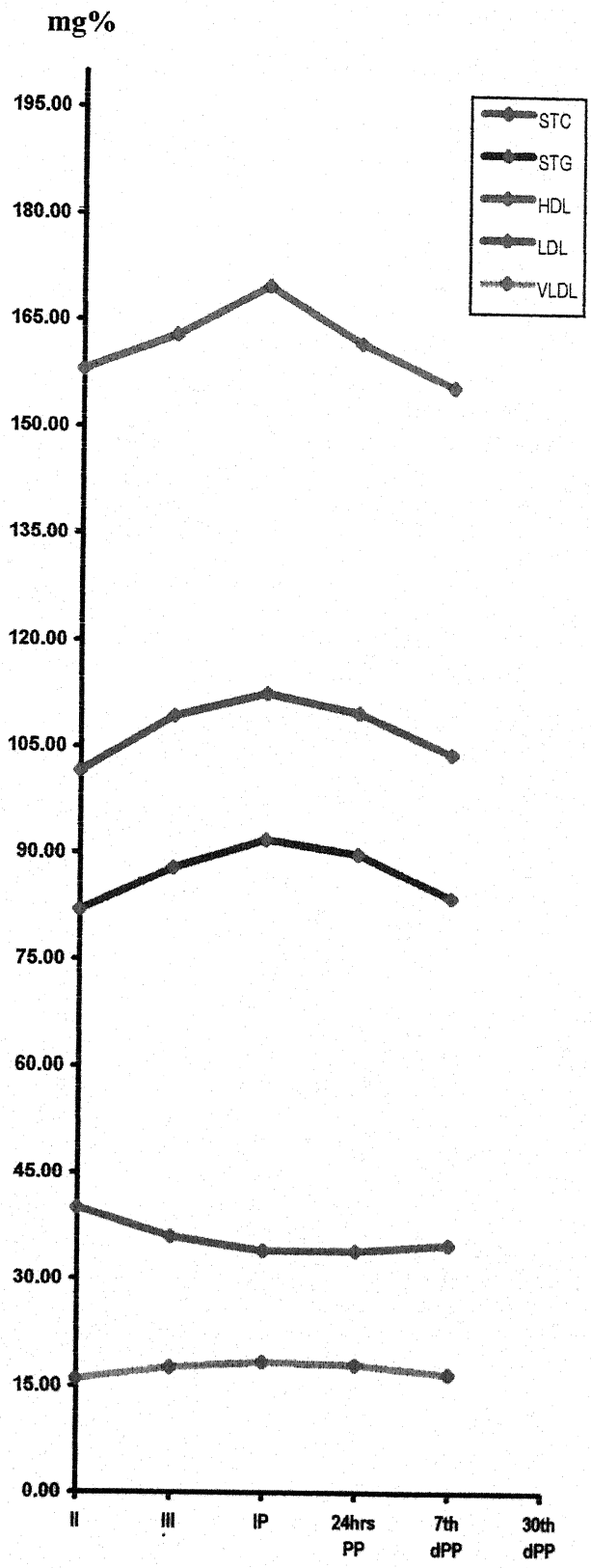
*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 178 | 185 | 192 | 190 | 183 | 180 |
| STG | 98 | 104 | 110 | 106 | 102 | 100 |
| HDL | 37 | 34 | 32 | 30 | 32 | 32 |
| LDL | 121.4 | 130.2 | 138 | 137.8 | 130.6 | 128 |
| VLDL | 19.6 | 20.8 | 22 | 21.2 | 20.4 | 20 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***13%↓ in HDL**, up to labour*
* *7%↑ in STC, maximum value during labour*
* *12% ↑ in LDL, maximum value during labour*




# I U G R GROUP

*Case no 8*

*Patient - Nafisa*
*26yrs*

* *$G_3P_2L_2$*
* *Lower Socioeconomic Status*
* *Non Vegetarian*
* *Patient known case of Rheu.H.D*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing evidence of mild IUGR*
* *Out come⇒ F.T.N.D, female baby wt 2.35 kg*

*Values mg%*

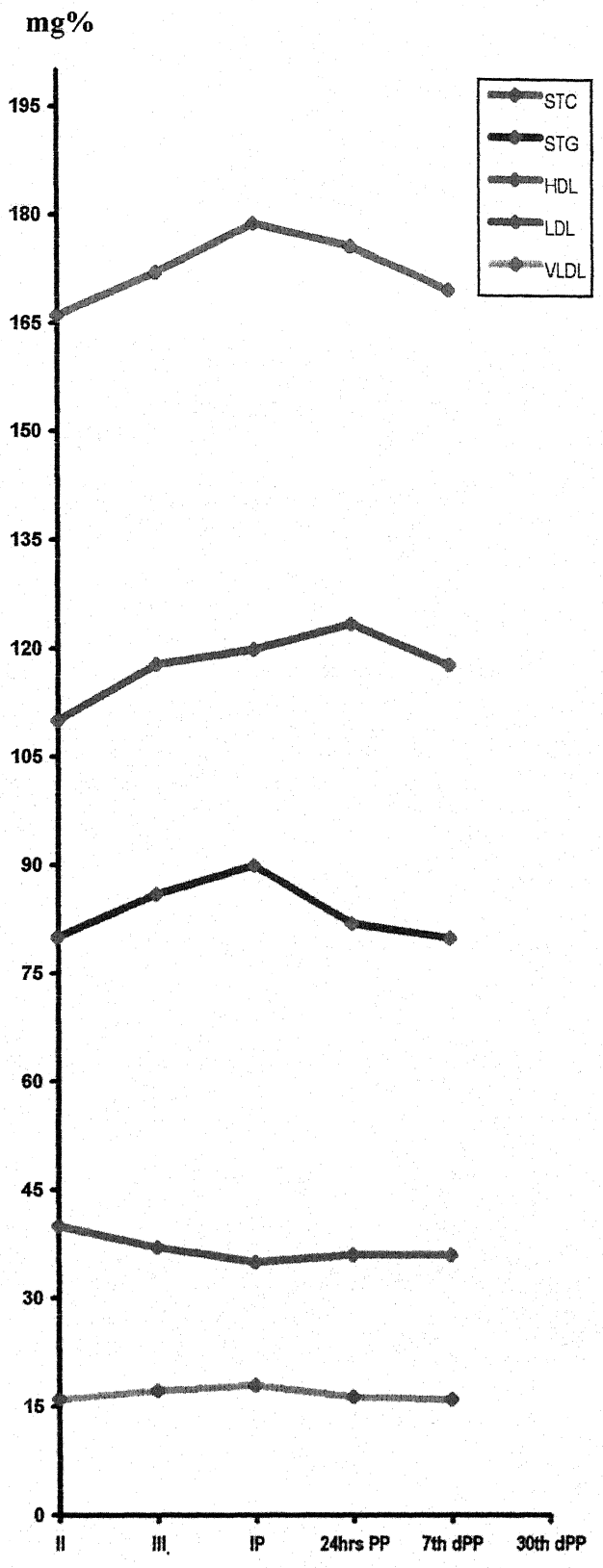
| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 158 | 163 | 170 | 162 | 156 | - |
| STG | 82 | 88 | 92 | 90 | 84 | - |
| HDL | 40 | 36 | 34 | 34 | 35 | - |
| LDL | 101.6 | 109.4 | 112.6 | 110 | 104.2 | - |
| VLDL | 16.4 | 17.6 | 18.4 | 18 | 16.8 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***15%↓ in HDL** , up to labour*
* *7%↑ in STC, maximum value during labour*
* *12% ↑ in LDL , maximum value during labour*

**mg%**




# I U G R GROUP

*Case no 9*

*Patient - Sushma*
*25yrs*

* *G1P1L0*
* *Middle Socioeconomic Status*
* *Vegetarian*
* ***C/o Failure to gain weight***
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing mild IUGR*
* *Out come⇒ Premature vaginal delivery, male baby wt 2.0 kg*

*Values mg%*

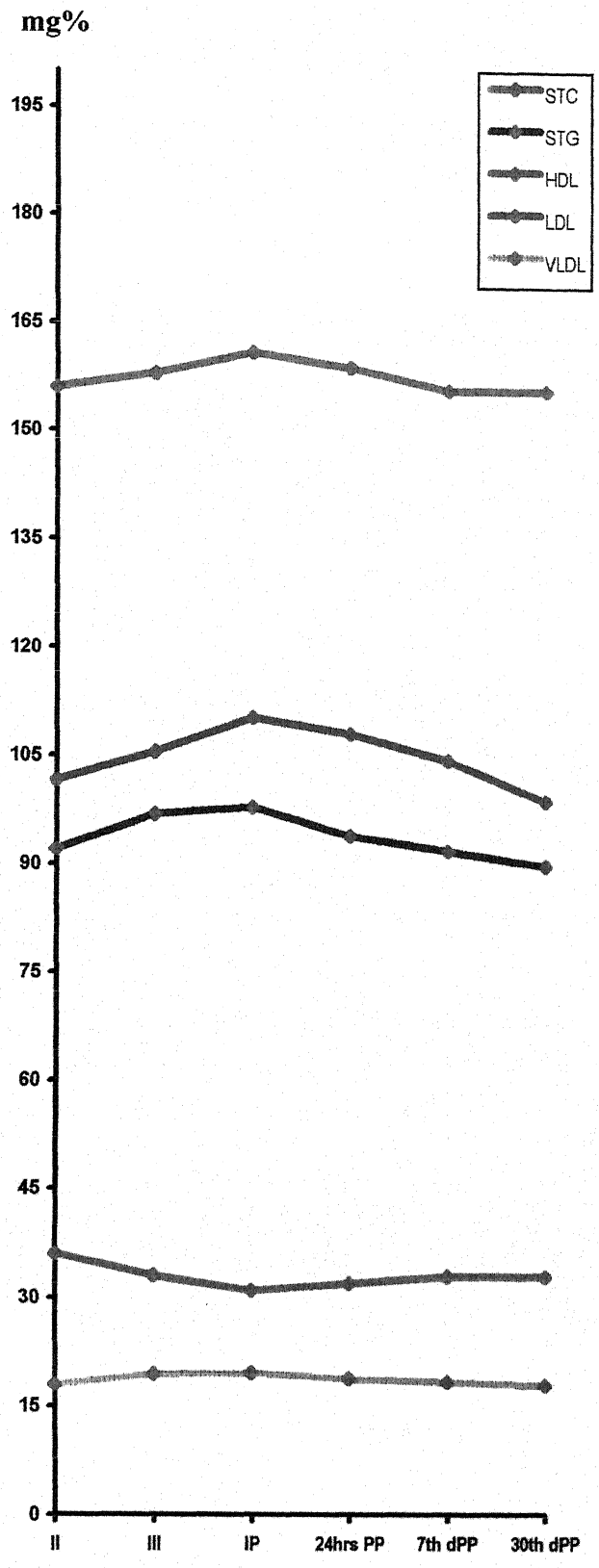
| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 166 | 172 | 179 | 176 | 170 | - |
| STG | 80 | 86 | 90 | 82 | 80 | - |
| HDL | 40 | 37 | 35 | 36 | 36 | - |
| LDL | 110 | 117.8 | 120 | 123.6 | 118 | - |
| VLDL | 16 | 17.2 | 18 | 16.4 | 16 | - |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***12%↓ in HDL** , up to labour*
* *8%↑ in STC, maximum value during labour*
* *9% ↑ in LDL , maximum value during labour*

**mg%**




## I U G R GROUP

*Case no 10*

*Patient - Pista*
*26yrs*

* *G3 P2 L2*
* *Lower Socioeconomic Status*
* *Vegetarian*
* *Detected on routine checkup*
* *Fundal height does not corresponding to period of Amenorrhoea*
* *USG - Showing evidence of severe IUGR with Small placenta with Oligohydramnios*
* *Out come⇒ LSCS done due to failed surgical induction delivery of dead female baby*

*Values mg%*

| | II | III | IP period | 24hrs PP | 7th dPP | 30th dPP |
|---|---|---|---|---|---|---|
| STC | 156 | 158 | 161 | 159 | 156 | 156 |
| STG | 92 | 97 | 98 | 94 | 92 | 90 |
| HDL | 36 | 33 | 31 | 32 | 33 | 33 |
| LDL | 101.6 | 105.6 | 110.4 | 108.2 | 104.6 | 99 |
| VLDL | 18.4 | 19.4 | 19.6 | 18.8 | 18.4 | 18 |

*STC 1mmol/L = 38.76mg%*
*STG mmol/L = mg%x0.0114*
*HDL mmol/L = mg%/38.76*

***Legend :***

* ***14%↓ in HDL**, up to labour*
* *slight↑ in STC, maximum value during labour*
* *10% ↑ in LDL, maximum value during labour*

## TABLE XII

## Serum Lipoprotein Profile in cases of IUGR in relation to severity of IUGR

| | severity | II trimester | IIItrimester | IP period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|---|
| STC mg % mean±SD | Severe | 166.75± 7.5 | 168.75± 8 | 173.75± 8.49 | 170.25± 7 | 167.75± 7.4 | 166.25± 8.2 |
| | Mild | 170.13± 8.79 | 174.25± 9.89 | 180± 9.8 | 174.4± 10.4 | 169.45± 9.2 | 165.41± 8.7 |
| LDL mg % mean±SD | Severe | 112.75± 8.17 | 117± 5.51 | 122.5± 8.6 | 119.5± 7.4 | 117± 6.2 | 115± 5.6 |
| | Mild | 114.31± 8.99 | 121± 9.4 | 128.83± 8.59 | 122.9± 7.4 | 118.6± 6.8 | 111± 5.4 |
| HDL mg % mean±SD | Severe | 35.75± .5 | 32.25± .5 | 30.25± .57 | 31.75± .5 | 31.75± .42 | 32.75± .38 |
| | Mild | 38.91± 1.38 | 35.55± 1.64 | 33.35± 1.9 | 33.05± 1.55 | 34.05± 2.0 | 32.91± 1.8 |

Table XII shows that there was rise in both subgroups of IUGR in STC and LDL from IInd trimester to IIIrd trimester and from IIIrd to labour & it was statistically not significant . But fall in HDL from 2nd trimester to labour was staistically significant.

Values of STC , LDL were higher in subjects with mild IUGR while these were lower in subjects with severe IUGR. But these changes were statistically not significant . Values of HDL were lower in severe IUGR group in comparison to mild IUGR in the corresponding period of pregnancy , during labour and there after.

| | | |
|---|---|---|
| IInd trimester | mild vs severe | $p < .05$ |
| IIIrd trimester | mild vs severe | $p < .001$ |
| during labour | mild vs severe | $p < .001$ |
| 1st PP day | mild vs severe | $p < .05$ |

## TABLE XIII COMPARING LIPOPROTEIN PROFILE IN CASES OF PREECLAMPSIA, ECLAMPSIA AND IUGR DURING IIIrd TRIMESTER OF PREGNANCY.

| GROUP | No.of cases | STCmg% mean+S.D | LDLmg% mean+S.D | HDL mg% mean+S.D |
|---|---|---|---|---|
| Preeclampsia Gp "A" | 9 | 196.77± 30 | 140.56± 22.48 | 33.52± 5.52 |
| Eclampsia Gp "B" | 17 | 219.37± 36.3 | 156.88± 29.96 | 32.41± 3.96 |
| IUGR Gp "C" | 10 | 171.5± | 119.0± 8.67 | 33.9± 1.76 |

Table XIII shows that during IIIrd trimester mean STC values was highest in subjects with eclampsia , then in subjects with pre- eclampsia and lowest in subjects with IUGR . This was statistically significant.

| | |
|---|---|
| A Vs C | $p < .001$ |
| B Vs C | $p < .001$ |
| A Vs B | $p < .05$ |

Similarly mean LDL value was highest among eclampsia Gp , then in subjects with pre-eclampsia and lowest in IUGR group.

| | |
|---|---|
| A Vs C | $p < .05$ |
| B Vs C | $p < .001$ |
| A Vs B | $p > .05$ |

mean HDL value was nearly equal in subjects with pre-eclampsia and IUGR

| | |
|---|---|
| A Vs C | $p > .05$ |
| B Vs C | $p > .05$ |
| A Vs B | $p > .05$ |

## TABLE XIV COMPARING SERUM LIPOPROTEIN PROFILE IN CASES OF PREECLAMPSIA,ECLAMPSIA & IUGR DURING LABOUR

| GROUP | No.of cases | STCmg% mean+S.D | LDLmg% mean+S.D | HDL mg% mean+S.D |
|---|---|---|---|---|
| Preeclampsia | 10 | 207.8± 28.86 | 152.98± 22.50 | 32.0± 4.12 |
| Eclampsia | 17 | 234.41± 40.17 | 178.82± 32.03 | 29.0± 4.47 |
| IUGR | 10 | 176.9± 11.20 | 125.4± 10.83 | 31.8± 3.34 |

Table XIV shows that during labour mean STC and mean LDL values were highest in subjects with eclampsia , then in subjects with pre-eclampsia and lowest in subjects with IUGR.

| | | |
|---|---|---|
| For STC & LDL | A Vs C | $p < .001$ |
| | B Vs C | $p < .001$ |
| | A Vs B | $p < .001$ |

Mean HDL value was maximun in pre-eclampsia and minimum in eclampsia

| | |
|---|---|
| A Vs C | $p > .05$ |
| B Vs C | $p > .05$ |
| A Vs B | $p > .05$ |

## TABLE XV SHOWING LIPOPROTEIN PROFILE IN CASES OF PREECLAMPSIA, ECLAMPSIA AND IUGR ON 30th POST PARTUM DAY.

| GROUP | No.of cases | STCmg% mean+S.D | LDLmg% mean+S.D | HDL mg% mean+S.D |
|---|---|---|---|---|
| Preeclampsia | 4 | 172.5± 32.24 | 116.1± 24.49 | 35.0± 3.36 |
| Eclampsia | 6 | 160.83± 24.5 | 131.0± 16.27 | 29.6± 3.88 |
| IUGR | 6 | 165.83± | 113.00± 9.83 | 32.83± 3.36 |

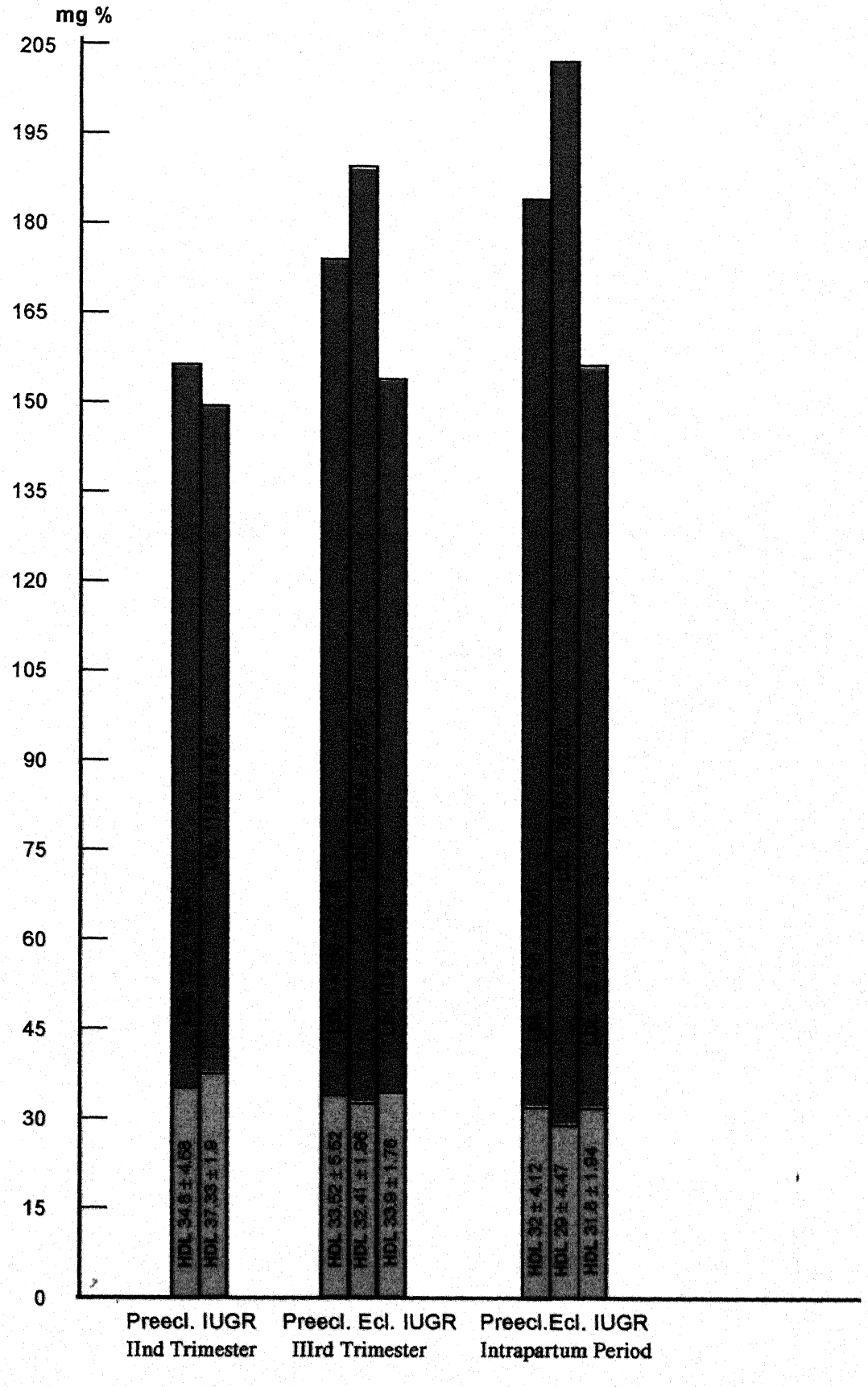
Table XV shows that STC and LDL values were highest in eclampsia , then in pre-eclmapsia and lowest in subjects with IUGR

| | | |
|---|---|---|
| For STC and LDL | A Vs B | $p > .05$ |
| | A Vs C | $p > .05$ |
| | B Vs C | $p < .05$ |

HDL value was highest in subjects with pre-eclampsia

| | |
|---|---|
| A Vs C | > .05 |
| B Vs C | > .05 |
| A Vs B | < .05 |

## Component BAR Diagram Showing changes in HDL and LDL during Pregnancy and labour in patients with preeclampsia, Eclampsia and IUGR



# DISCUSSION

# *DISCUSSION*

Hyperlipidaemia of pregnancy is now an established fact . Levels of hormones like oestrogen and progesterone significantly increace during pregnaney and falls with the explusion of placenta so these hormone are indirectly responsible for altered lipid profile of pregnaney .So in cases of complicated pregnancy (Preeclampsia, Eclampsia & IUGR)there may be alteration in hormone levels which in turn will lead to alteration in lipid profile.So this study include changes in serum lipoproteins in cases of pre eclampsia, eclmpsia and IUGR and comparison of these changes with each other .

The Basal level of plasma lipids in normal subjects are as follows:-

STC = < 200 mg%
STG = < 160 mg %
HDL = 30 - 90 mg %
LDL = 50 - 130 mg %
VLDL = < 32 mg %

( Annal . int medicine . 1993, 119 (7) part 1.)

1. PRE ECLAMPTIC AND ECLAMPTIC Pts ( GROUP A ,GROUP B) :

The observed mean STC during 2nd trimertor was 178.33 ± 21.0 , which increased to 196.77 ± 30 mg % at 3rd trimester, and reaching to 207.8 ± 28.86 mg% during labour .This rise in STC during pregnancy in cases of preeclampsia was statistically significant.

This level abruptly declined to 183.2 ± 25.36 on 24 hours P.P. and slowly reached to 172.5 ± 33.24 on 30th P.P. day. This fall on 1st P.P. day was also statistically significant.

Similarly in eclampsia mean STC level during 3rd trimester was 219.37± 36.3 mg % which touched to a peak of 234.41 ± 40.17 mg % during labour and declined to 209.45 ± 31.2 mg % on 24hrs P.P.These change were statistically significant .STC decreased to 180.83 ± 24.5 mg % on 30th P.P.day which was much less than the value at 3rd trimester . This rise in STC upto labour was in accordance with Nelson ,1966, Pontis and Purandare ,1972,Hyten and Lind ,1973,Chaturvedi , Tandon and Singh ,1978.

The rise in STC level from 3rd trimerter to I.P. was much less than fall with in 24 hrs. P.P. pt`s . with eclampsia ,this may be due to the

fact that the values of third trimerter were unusally at the end of third trimerter and pt`s usally delivered with in 2-5 days after admission

.

Values of STC in pt`s with eclampsia were much higher in comparison to patients with pre eclampsia in the corresponding period of ges tation and these changes were statistically significant .

Rise in STC from 3rd trimester to labour was slightly more 6.8% in eclamptic pt`s in comparison to pre eclampsia 5.5%. Fall in STC level with in 24 hrs P.P. was 10.6% in eclamptic pt`s ,while in pt`s with pre eclampsia it was 11% ,it was nearly equal .

SERUM LOW DENSITY LIPOPROTEIN - LDL-C :

The observed mean LDL value during 2nd trimester in cases of pre eclampsia was 123.9 ± 14.94 mg % ,it in creased to 140 .56 ± 22.48 at 3rd trimarter and touched to a peak of 152.98 ± 22.50 during labour . Rise from 2nd trimester to 3rd trimester and from 2nd trimester to labour was statistically significant .

However rise from 2nd to 3nd trimester was not significant statistically .These value declined to 127.90 ± 20.07 on 24 hrs P.P.,119.80 ± 21.01 on 7th day P.P. day 116.1 ± 24.49 on 30th day P.P which was little less than the value at 2nd trimester .

Observed mean LDL-c value in pt`s with eclampsia was 156.88 ± 29.96 at 3rd trimester,during labour it was 178.82± 32.03 this rise in LDL was statistically significant these values declined to 157.37 ±20.87 on 1st P.P.day, it decreased to 131±16.27 on 30 th P.P. day .It was much less than the value at 3rd trimester.The fall after labour was also statistically significant.

Values of LDL -C in pt`s with Eclampsia were much higher in comparison to pre eclampsia during Pregnancy,labour and post partum period. Percentage rise of LDL -C was higher in pt`s with eclampsia (14%) from 3rd trimester to labour ,in comparison to 8% in pt`s with pre eclampsia ,the difference in LDL -C value at 3rd trimester between pt`s with pre eclampsia and eclampsia was statistically not significant but it became statistically significant during labour due to more rise of LDL -C in eclamptic patients.

Fall in LDL valuewas 11.8% in pt`s with eclampsia ,while it was 16% in pt`s with pre eclampsia.Similar findings were reported by Konttinen et al,1964 Mullick and Bagga 1964,Barclay et al,Worth et al 1975,Pontis et al and Knopp et al 1981.

Similar finding were reported by Konttinen et al, 1964, Mullick and Bagga , 1964,Barclay et al worth et al ,1975, Pontis et al and Knopp et al ,1981 .

HDL -C :

The observed mean HDL level during 2nd trimerter was 34.8 ± 4.58 in pre eclamptic pt`s ,it declined to 32 ± 4.12 during labour .This fall was statistically just significant .The level of HDL started rising again soon after labour and it reached to 35.0 ± 3.36 at 30th P.P. day .In pt`s with eclampsia the mean level of HDL during 3rd trimerter was 32.4 ± 3.96 mg % which decreased to 29± 4.47 during labour and gradually raised to 30.1± 5.40 on 24 hrs P.P.and further decreased to 29.6 on 30th P.P.day .The fall in HDL from 3rd trimester to labour was statistically highly significant .

When we compared HDL level in both groups we found that mean value of HDL was much lower in pt's with eclampsia than in pre-eclampsia in the corresponding period of gestation , labour and after delivery. The difference in the values during labour and in the post partum period was statistically significant the HDL level started rising early in pts with pre-eclampsia while in pts. with eclampsia value remained on lower side even upto 30th P.P. day . Total decrease of HDL-C from 3rd trimester to labour was only 8.04 % in pts. with pre-eclampsia while it was 11.7 % in pt's with eclampsia .

As level of HDL-C is influenced by the level of Oestrogen and Oestrogen during pregnancy are mainly synthesized by placenta . HDL-C reflects placental function . Toxaemia of pregnancy is associated with chronic placental insufficiency leading to decreased production of Oestrogen . In our study we also found the same type of change that is fall of HDL level in Pts of eclampsia and pre-eclmapsia during pregnancy . HDL - C in pre-eclampsia has also been reported previously (Scandrett , 1959).

Serum Triglycerids (STG)

In patients with pre-eclampsia the observed mean STG value was 97.2 ± 16 during 2nd trimester , it raised to 110 ± 20.33 during labour after labour it declined to 99.9 ± 19.2 on 1st P.P. day and further decreasedto 89.5 ± 22.52 on 30 th P.P. day . The rise in STG in pts with pre-eclampsia from 2nd trimester to labour was 13.4 % and it was statistically significant . STG in pre-eclamptic pts showed a decreasing trend during post partum period.

In pts with eclampsia mean STG values were 111.75 ± 24.79 during 3rd trimester , 114.82 ± 26.42 during labour and it decreased thereafter to 85.5 ± 18.02 on 30th P.P. day . rise from 3rd trimester to labour was only 2.6% and it was statistically not significant. These findings are in accordance with previous observations (Konttinen et al 1979 , Kalkhott et al 1978 , Knopp et al , 1981 , Dermandy et al , 1989). While comparing the values . In the same period in both group of patients values were higher among patients with eclampsia except on 30th P.P. day . Slow rise in STG during pregnancy in both group of patients may be due to the fact that toxaemia of pregnancy is associated with chronic placental insufficiency leading to decreased production of Oestrogens.

Very Low Density lipoproteins - VLDL

In pt's with pre-eclampsia , VLDL values were 19.28± 3.3 during 2nd trimester , 22.1 ± 3.81 during labour and thereafter it gradually decreased to 18.5 ± 4.11 on 7th P.P. day and 17.9 ± 4.5 on 30th P.P. day.Rise in VLDL was 14.5% upto labour and it was statistically significant.

In pts with eclampsia VLDL values were 22.35 ± 5.12 during 3rd trimester ; 23 ± 5.38 during labour and 17 ± 3.94 on 30th P.P. day . there was very slight rise (3%) from 3rd trimester to labour in pts with eclampsia.

We divided the pts of pre-eclampsia broadly into twogroups depending on it's severity.

- patients with mild pre-eclampsia
  - * BP < 160 /110 mm Hg
  - * Proteinuria absent
- patients with severe pre-eclampsia
  - * BP > 160 /110 mm Hg
  - * Protein uria present

Though values of STC , LDL during 2nd trimester were less in patients with severe pre-eclampsia but rise was more in comparison to patients with mild IUGR . Percentage rise in STC and LDL was 13.8% and 20 % respectively in pts with mild pre-eclampsia while it was 21 % and 26% in pts with severe pre-eclampsia. Values of HDL were lower in patients with severe pre-eclampsia and this difference was statistically significant.

We also studied the serum lipoprotein profile in cases of pre-eclampsia who delivered low birth weight babies (weight < 2.5 kg). There

was not much difference in levels of STC and LDL in pts who delivered LBW babies from the mean value for the whole group as such. However decrease in HDL level from 2nd trimester to labour was more (13%) in this group in comparison to whole group where it was 8% .

Serum lipoprotein in pt's with unfavourable outcome -

In our study incidence of prematurity was 20% in patients with pre-eclampsia while incidence LBW babies was 30%.

In contrast to pts. with pre-eclampsia , patients of eclampsia who delivered still births ( 5 out of 18) child showed marked deviation of serum lipoproteins from other patients of similar groups . mean value of STC in patients who delivered still birth child during 3rd trimester was 251.3 $\pm$ 42.78 while the mean value of whole group was 219.37 $\pm$ 36.3 , it raised to 278.0 $\pm$ 39.2 during labour it decreased to 236.8 $\pm$ 34.45 on 24 hrs P.P. and came to 205 $\pm$ 7 on 30th P.P. day . Similarly LDL value during 3rd trimester was 192.8 $\pm$ 58.72 , it touched to a peak of 220 $\pm$ 31.72 during labour , then it declined to 183 $\pm$ 29.51 on 24 hrs . P.P. and decreased to 150 $\pm$ 10 on 30th P.P. day . Differences in the values of STC & LDL during 3rd trimester labour and in the post patrum period was statistically significant with the mean values of these parameter for the group as such , however there was not much difference in the level of HDL as such . Rise in STC and LDL in pts. with still birth was 10.7% and 14.5% respectively , while it was 6% and 14.5 for the group as such . Similarly fall in the HDL was 14 % and 10 % respectively.

Effect of parity -

We studied the relation of parity with pre-eclampsia and eclampsia . pre-eclampsia was found to be more common ( 6 out of 10) in primiGravida . Similarly eclampsia was also found to be more common (11 out of 17) in PrimiGravida. Similar observation was made by Colvin et al (1939) who noted high percentage of cases of Toxaemia among Young primiGravida . Earlier workers also noted similar observations (Acosta - Sisson and bains , 1930 : Upshaw et al , 1932 ) . Colvin also concluded that Toxaemia is more concerned with age rather than parity . We also studied the differences in serum lipoproteins in relation to parity. In pt's with pre-eclampsia mean value of STC and LDL was little higher in PrimiGravidae in comparison to multi Gravidae but this was statistically not significant . There was no constant difference in the level of HDL in both group of patients.

In patients with eclampsia levels of STC and LDL was higher during third trimester and on 30th P.P. day in Primi Gravidae in

comparison to multi Gravidae . Like pt's of pre-eclampsia , there was no constant difference in the level of HDL in both groups.

In the present study most of the Toxaemic mothers belonged to low and middle socio-economic status . Similar observations was made by De alvarez and Bratvold (1961) . Most of the Toxaemic mothers were vegetarian . 70% of the pre-eclamptic and eclamptic patients were vegetarian . The dietary content of protein and fat plays a part in the production of toxaemia of pregnancy. Majority of earlier Hinselmann (1923) Groene (1923) , and Bublitz Chenko (1925) concluded that lesser intake of protein and fat attributed to the production of Toxaemia.

40% of the pts. presented with unconsciousness in eclampsia group . On observing the lipoprotein profile it was found that mean STC & mean LDL was much higher in these patient in comparison to other patients without unconsciousness and this difference in STC & LDL level was Statistically significant during pregnancy , labour and post partum period . So it can be concluded that severity of eclampsia affects lipoprotein profile directly.

One pt. of pre-eclampsia group developed renal failure but there was no significant changes in the serum lipoproteins from other pts. 4 out of 17 pts. of eclampsia group developed renal failure and two patients showed impaired liver function but there was no significant changes in serum lipoproteins from other pts. though values were little higher specially in patients with renal failure.

II Patients with Intrautrine growth retardation - ( Group - C)

The observed mean STC value in this group during 2nd trimester was 168.44 ± 7.95 , it raised minimally t 171.5 ± 9.0 during 3rd trimester and touched to a peak of 176.9 ± 9.59 mg % during labour . This declined to 172.3 ± 9.2 on 24 hrs P.P. and reached to 165.83 ± 10.83 on the 30th P.P. day . Rise in STC upto labour and fall on 24 hrs P.P. , 7th P.P. day and 30th day was statistically not signficant . Total rise in STC was only 4.7% while it was 16% in pts. with pre-eclampsia.

When we compared the STC level in the three groups , they were lowest in pts. with IUGR during antepartum period , labour and post partum period and this difference was statistically highly significant.

Mean LDL value was 113.53 ± 8.0 during 2nd trimester , 119 ± 8.67 at 3rd trimester and 125.4 ± 8.77 during labour . It raised only 10% from 2nd trimester to labour while in pts. with preeclampsia total rise was 24% and 14% from 3rd trimester to labour in pts . with preeclampsia.

Rise in LDL value was not statistically significant . LDL value was also lowest in pts. with IUGR and differnce in pts. with IUGR with pts. of toxaemia was statistically significant.

Observed mean HDL value was though highest in pts. with IUGR during 2nd trimester but it's level declined rapidly reaching to 31.8 ± 1.94 during labour . Total decrease in HDL was 14% in pts with IUGR while it was 8% in pts. with preeclampsia and 10.4% in pts . with eclampsia (from 3rd trimester only). The fall in HDL level in this group was statistically highly significant, but fall in HDL was highest from 2nd trimester to labour among pts. with IUGR in comparison to preeclampsia.

Mean STG and VLDL levels during 2nd trimester were 87.88 ± 4.13 and 17.52 ± 2.5 , these values raised to 97.2 ± 7.1 and 19.44 ± 2.13 during labour . These levels gradually declined to 92.7 ± 5.62 and 18.54 ± 2.2 on 1st P.P. day and 91 ± 4.27 & 18.2 ± 2.6 on the 30th P.P. day . Rise in STG and VLDL was statistically not significant . When we compared these values with values of preeclamptic and eclamptic patients , values were the lowest in pts with IUGR and these differences were statistically significant during pregnancy & labour.

The rapid fall and low levels of HDL during pregnancies complicated by IUGR may be due to the chronic placental insufficiency leading to the decreased production of Oestrogen and ultimately causing marked fall in HDLlevel.

In normal pregnancy rising maternal plasma titre of Oestrogen appears to be the principle hormonal factor responsible for enhanced endogeneous synthesis of triglycerides . It has been studied by Berzin and Vonstudintz (1957) that oestrogen causes rise in circulatory lipid levels . In cases of IUGR lower Oestrial between 32-34 weeks are valuable in predicting IUGR when screening high risk cases (Beischer et al , 1984 ) so lower oestrial may in turn lead to lesser rise in triglyceride levels in IUGR cases.

The serum concentration of VLDL is dependant on it's rate of secretion by liver & degradation by lipoprotein lipase and lipoprotein lipase activity was found to be significantly increased in cases of chronically deprived fetuses like in case of IUGR in order to supply free fatty acids to the fetus (Y. Biale , 1985 ) . In these situations of chronic fetal distress like in IUGR there is decreasd supply of glucose to fetus , so complimentary changes take place in the placenta leading to an increased supply of free fatty acids to fetus which are liberated by hydrolysis of circulating maternal triglycerides .

It is known that cholesterol is transported in the form of lipoprotein in the plasma and higher proportion of cholesterol is formed in LDL (beta lipoprotein) . Studies on cultured fibroblast lymphocytes and arterial smooth cells have shown existance of specific binding sites or LDL receptors . After binding LDL is internalized by an adsorptive endocytice process and hydrolysed by lyso somal enzymes giving rise to amino acids cholesterol and free fatty acids . It is postulated that in cases of IUGR there may be defect in receptor level of LDL , but the exact nature is not known . In our study we found slight rise in LDL level during pregnancies of Pts with IUGR , but we could not find out the exact cause for which further study is needed.

We broadly divided IUGR group into two subgoups depending on it's severity decided by USG examination of fetus and monitoring it's growth as pregnancy advanced . We stuied the difference in lipoproteins in both subgroup and found that though STC , LDL values were lower in pt's with severe IUGR in comparison to patients with mild IUGR but it was not significant statistically. HDL values were much lower in pts with severe IUGR and it was statistically significant.

| | | | |
|---|---|---|---|
| For HDL | mild Vs severe | IInd trimester | $p < .05$ |
| | mild Vs severe | IIIrd trimester | $p < .001$ |
| | mild Vs severe | during labour | $p < .001$ |

# SUMMARY & CONCLUSION

# *SUMMARY AND CONCLUSION*

The present study was carried out to evaluate the changes in serum lipoproteins in high risk pregnancies (Preeclampsia , eclampsia & IUGR) during their Ante partum , Intra partum and Post partum period (upto 1 month) and also to know the changes in lipoprotein pattern in relation to parity , severity and also to know the incidence of other complications related to disease itself.

Total 37 cases were taken (10 preeclampsia , 17 eclampsia and 10 IUGR) and they were followed up during Ante partum , Intra partum and Post partum period . Lipoprotein levels (STC , STG , HDL , LDL & VLDL) were estimated during 2nd and 3rd trimester , intra partum 24 hrs. , 7 day and 1 month post partum.

1. **Serum lipoproteins during Ante partum period**

( a) Serum Total Cholesterol ( STC)

( i ) In Preeclampsia rise from 2nd trimester to 3rd trimester was statistically significant ( $p < .05$) while rise from IIIrd trimester to labour was statistically not significant ( $p > .05$).

( ii ) In Eclampsia rise from 3rd trimester to labour was statistically highly significant ( $p < .001$ ).

(iii) In cases of IUGR rise in STC from 2nd to 3rd , 3rd to labour and from 2nd trimester to labour was statistically not significant ( $p > .05$ )

(iv) Values were highest in cases of eclampsia.

(b) Low density Lipoproteins (LDL)

( i ) In pts. with preeclampsia rise from 2nd trimester to labour was statistically highly significant $p < .001$ and from 3rd trimester to labour it was statistically not significant ( $p > .05$)

( ii) In pts. with eclampsia rise from 3rd trimester to labour was statistically highly significant ( $p < .001$)

( iii ) In pts . with IUGR rise from 2nd trimester to 3rd trimester & from 3rd to intrapartum and from 2nd to labour was statistically not significnat ( $p > .05$)

(iv) Values were highest in pts with eclampsia.

c. High Density Lipoproteins( HDL) -

( i ) In preeclamptic pts HDL values gradually declined from 2nd trimester to 3rd trimester & from 3rd to labour

| | |
|---|---|
| IInd vs IIIrd | $p > .05$ |
| IIIrd vs I.P. | $p > .05$ |

IInd vs I.P. $p < .05$

( ii ) In eclamptic pts HDL gradually dclined from 3rd trimester to labour

IIIrd vs I.P. $p < .001$

(iii) In pts with IUGR HDL declined from 2nd trimester to 3rd and from 3rd trimester to labour.

IInd vs IIIrd $p < .05$

IInd vs I.P. $p < .001$

(iv) values were lowest among pts with eclampsia while fall from 2nd trimester to labour was higher in pts with IUGR in comparison to preeclampsia.

(d) Serum triglycerides (STG) &Very low density lipoprotein (VLDL) -

( i ) In pts. with preeclampsia rise in STG and VLDL from 2nd trimester to labour was significant

IInd vs I.P. $p < .05$

IInd vs IIIrd $p > .05$

IIIrd vs I.P. $p > .05$

(ii) In eclamptic pts . STG and VLDL raised minimally $p > .05$

(iii) In pts with IUGR STG and VLDL raised from IInd to IIIrd and from IIIrd to labour but it was statistically not significant

$p > .05$

(iv) Values were highest among pts with eclampsia

2. **Serum lipoproteins during labour**

(a) STC , LDL , STG and VLDL attained their peak during labour in all the three groups.

(b) HDL declined from their initial value gradually in all the three group and was lowest during labour.

(c) STC , LDL , STG and VLDL values wee highest in pts with eclampsia while HDL values were lowest in eclampsia .

3. **Serum Lipoprotein during post partum period**

(a) Serum Total Cholesterol (STC)

( i ) In pre eclamptic pts it declined abruptly within 24 hrs and then gradually upto 1 month

IP vs 24 hrs PP $p < .001$

IP vs 7thday PP $p < .001$

It returned to its initial value on 7th PP day

(ii) In pts with eclampsia it declined abruptly with in 24 hrs and then gradually upto 1 month

IP vs 24 hrs. PP $p < .001$

IP vs 7 thday PP $p < .001$

Fall was too much on 30th d PP in comparison to its initial value on IIIrd trimester.

(iii) In pts. with IUGR it declined gradually and reached to its initial value on 7th PP day

IP vs 1st PPday $p > .05$
IP vs 7th , 30th d PP $p > .05$

(b). Low Density Lipoprotein (LDL)

(i) in pts with pre eclampsia it fall abruptly with in 24 hrs P.P. and then gradually upto 30th d PP

IP vs 24 hrs PP $p < .05$
IP vs 7md PP $p < .05$

It returned to it's initial value near about 7th day P.P

(ii) In Eclampsia pts. it declined maximum within 24 hrs PP then gradually upto 1 month

IP vs 24 hrs. PP $p < .001$
IP vs 7thd PP $p < .001$
IP vs 30th md PP $p < .001$

It returned to it's initial value on 30th PP day

(c) HighDensityLipoprotein(HDL)

(i) In pts with preeclampsia HDL raised within 24 hrs PP then upto 7thd PP but it was constant after that.

IP vs 24 hrs PP $p > .05$
IP vs 7md PP $p < .05$

(ii) In pts with eclampsia it increased within 24 hrs. P.P. after that it decreased then again increased.

IP vs 24 hrs PP $p > .05$
IP vs 7md PP $p > .05$
IP vs 30md PP $p > .05$

(iii) In pts. with IUGR , it raised gradually upto 7th PP day then declined on 30th P.P. day

IP vs 24 hrs. PP $p > .05$
IP vs 7thd PP $p > .05$
IP vs 30thd PP $p > .05$

(d) Serum Triglyceride & Very Low Density Lipoprotein(STG & VLDL)

(i) In pts with pre eclampsia it fall maximum within 24 hrs then gradually upto 30thd P.P.

IP vs 24 hrs.PP $p > .05$
IP vs 30 thd PP $p < .05$

(ii) In pts. with eclampsia it decreased maximum within 24 hrs P.P. then gradually upto 30th d . P.P

IP vs 24 hrs PP $p > .05$
IP vs 30th d PP $p < .05$

**Serum Lipoproteins in relation to severity-**

(i) On comparing the serum lipoprotein in mild and severe pre eclampsia . Percentage increase in STC and LDL was more in pts with severe pre eclampsia , values of HDL were lower in severe Pre eclampsia

(ii) In Eclampsia group, pts delivering still birth child showed much higher STC , LDL values than other pts in the same group and also decrease in HDL was slightly more in those pts.

(iii) In pts with IUGR , though values of STC and LDL were lower in pts. with severe IUGR but this difference was statistically not significant . However HDL level was much less in pts with severe IUGR and this difference was significant during pregnancy and labour.

One pt. from pre eclampsia group and four pts from Eclampsia group developed renal failure , two eclamptic pts. showed abnormal LFT . But serum lipoproteins were not markedly deviated in these pts, in comparison to other pts. except pts. with renal failure in eclampsia group but changes were not significant

**Serum Lipoprotein In relation to parity** -

(i) In Pre eclamptic pts mean value of STC and LDL were little higher in Primigravida but it was statistically not significant , no constant difference in level of HDL.

(ii) In Eclamptic pts STC and LDL values were higher in Primigravida in comparison to multigravida but this was statistically not significant there was no constant difference in HDL level .

(iii) 60% of pts were Primigravida in both groups.

**Socio Economic status**

40% of pre eclamptic pts , 55% of Eclamptic and 50% of IUGR pts were belonging to lower socio-economic status.

**Conclusion -**

At the end of our study we found that

*STC , LDL raised significantly in pts with Pre eclampsia , Eclampsia & attained maximum value during labour and decreased thereafter.

*STC , LDL raised minimally in pts with IUGR and attained their peak at labour and decreased thereafter

*HDL constantly decreased during pregnancy in all the three groups but this decrease was maximum in pts with IUGR

* *

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# MASTER CHART

# PRE ECLAMPSIA GROUP "A"

| Serial no | Name | Age | Gravida | S.Econo | Diet | Mode of Delivery | Out come |
|---|---|---|---|---|---|---|---|
| 1 | Monorma | 23yr | Primi | Middle | Veg . | FTND | M Baby 2.8 Kg |
| 2 | Mamta jain | 21yr | Primi | Middle | Veg | FTND | F Baby 2.6 kg |
| 3 | Parvati | 20yr | Primi | Lower | Veg | FTND | F Baby 2.6 kg |
| 4 | Rupali Rai | 26yr | G2 P2 L2 | High | N.Veg | Elective c.s. | M Baby 2.9 kg |
| 5 | Sangeeta | 22yr | Primi | High | N.Veg | FTND | M Baby 2.8 kg |
| 6 | Sangeeta Jain | 26yr | G3 P2 L2 | High | Veg | FTND | M Baby 2.6 kg |
| 7 | Guddi | 22yr | G2 P2 L2 | Lower | Veg | FTND | F Baby 2.6 kg |
| 8 | Sudha | 24yr | Primi | Lower | Veg | Veginal delivery (Premative) | F Baby 2 kg |
| 9 | Kiran | 24yr | G2 P2 L2 | Middle | N.veg | FTND | M Baby 2.25 kg |
| 10 | Bimla | 22yr | Primi | Lower | Veg | Vaginal delivery Primitive | M Baby 2.4 kg |

# ECLAMPSIA GROUP "B"

| Name | Age | Gravida | S.Econ. | diet | Mode of delivery | Out come |
|---|---|---|---|---|---|---|
| Rajni | 23 Yr. | Primi | Middle | N. Veg | Premature delivery | F.baby 2.4 Kg |
| Guddi | 26 Yr. | G3 P2 L2 | Lower class | N. Veg | Vaginal delivery | Dead baby |
| Meena | 25 Yr. | Primi | Upper Class | N. Veg | FTND | M.Baby 2.8 Kg |
| Hemwati | 22 Yr. | Primi | Middle | Veg. | Premature delivery | |
| Kashi bai | 25 Yr. | G1 P1 L1 | Lower class | Veg. | FTND | F.Baby 2.7 Kg |
| Gomti | 25 Yr. | G3 P3 L3 | Lower class | Veg. | Vaginal delivery | F.Baby 2.5 Kg |
| Mala | 23 Yr. | Primi | Middle | Veg. | FTND | F.Baby 2.4 Kg |
| Geeta | 18 Yr. | Primi | Middle | Veg. | Forccep delivery | F.Baby 2.8 Kg |
| Raj Kumari | 25 Yr. | G2 P1 L1 | Middle | N. Veg | Vaginal delivery | F.Baby 2.0 Kg |
| Susheela | 26 Yr. | G3 P3 L3 | Lower class | Veg. | FTND | F.Baby 2.8 Kg |
| Madhu | 18 Yr. | Primi | Lower class | N. Veg | Full term Veginal delivery | |
| Pawan Kumari | 21 Yr. | Primi | Lower class | Veg. | FTND | F.Baby 2.4 Kg |
| Raj Kumari | 26 Yr. | G2 P2 L2 | Lower class | Veg. | FTND | F.Baby 2.7 Kg |
| Kunwar Baj | 20 Yr. | Primi | Lower class | Veg. | Forcep delivery of still born (FT) | |
| Angoori | 24 Yr. | Primi | Lower class | Veg. | Vaginal delivery | |
| Jareena | 21 Yr. | Primi | Middle | N. Veg | FTND | F.Baby 2.6 Kg |
| Premwati | 26 Yr. | Primi | Middle | Veg. | FTND | F.Baby 2.4 Kg |

# IUGR GROUP "C"

| Cases no | Name | Age | Gravida | S.Ecno | Diet | Mode of del. | Out come | Height | Weight |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Sunita | 26 yrs | G5P4L3 | middle | veg | CS | M. baby 1.9 kg | 5'1" | 48 kg |
| 2 | Sunita | 24 yrs | Primi | lower | veg | premature vaginal del. | F. baby 2.10 kg | 5'2" | 42 kg |
| 3 | Uma Verma | 22 yrs | Primi | middle | N.veg | CS | M. baby 1.8 kg | 5'.0" | 48 kg |
| 4 | Geeta Tewari | 26 yrs | G4P3L3 | lower | veg | CS | M . baby 2.3 kg | 5'1½" | 46 kg |
| 5 | Rekha | 20 yrs | Primi | lower | veg | CS | F. baby 1.8 kg | 4'11" | 50 kg |
| 6 | Kusum | 25 yrs | G2P2L2 | lower | veg | premature vaginal del. | F. baby 2.2 kg | 5'2" | 52 kg |
| 7 | Kaush-alia | 26 yrs | G4P3L3 | middle | veg | vaginal del. | M. baby 2.2 kg | 5'1" | 48 kg |
| 8 | Nafisa | 26 yrs | G3P2L2 | lower | N.veg | vaginal del. | F. baby 2.35 kg | 5'0" | 46 kg |
| 9 | Sushma | 25 yrs | G1P1L0 | middle | veg | premature vaginal del. | M. baby 2.0 kg | 4'11" | 48 kg |
| 10 | Pista | 22 yrs | G3P2L2 | lower | veg | CS | M. baby 1.8 kg | 5'0" | 50 kg |

# PRE ECLAMPSIA GROUP "A"

## STC

| Name | II trimester | III trimester | IP Period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Manorama | - | 171 | 180 | 160 | 156 | - |
| Mamta Jain | 160 | 168 | 184 | 160 | 150 | 140 |
| Parvati | - | 210 | 210 | 200 | 190 | - |
| Rupali Rai | 180 | - | 208 | 180 | 170 | - |
| Sangeeta | - | 256 | 270 | 240 | 230 | 210 |
| Sangeeta Jain | 170 | 186 | 200 | 190 | - | - |
| Guddi | - | 184 | 190 | 160 | 156 | 150 |
| Sudha | 166 | 176 | 190 | 164 | 156 | - |
| Kiran | - | 180 | 190 | 168 | 160 | - |
| Bimla | 214 | 230 | 236 | 210 | 200 | 190 |

## STG

| Name | II trimester | III trimester | IP Period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Manorama | 112 | 114 | 105 | 102 | - | - |
| Mamta Jain | 76 | 80 | 84 | 81 | 76 | 70 |
| Parvati | - | 110 | 120 | 100 | 96 | - |
| Rupali Rai | 90 | - | 84 | 80 | - | - |
| Sangeeta | - | 144 | 150 | 134 | 130 | 110 |
| Sangeeta Jain | 110 | 116 | 120 | - | - | - |
| Guddi | - | 86 | 90 | 80 | 72 | 70 |
| Sudha | 90 | 96 | 90 | 82 | - | - |
| Kiran | - | 88 | 85 | 78 | - | - |
| Bimla | 116 | 128 | 128 | 120 | 112 | 108 |

# PRE ECLAMPSIA GROUP "A"

## HDL

| Name | II trimester | III trimester | IP Period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Manorama | - | 37 | 34 | 36 | 36 | - |
| Mamta Jain | 30 | 28 | 26 | 30 | 32 | 30 |
| Parvati | - | 40 | 38 | 38 | 36 | - |
| Rupali Rai | 36 | - | 32 | 38 | 34 | - |
| Sangeeta | - | 42 | 40 | 44 | 40 | 37 |
| Sangeeta Jain | 34 | 33 | 31 | 30 | - | - |
| Guddi | - | 33 | 31 | 33 | 36 | 34 |
| Sudha | 32 | 28 | 28 | 32 | 34 | - |
| Kiran | - | 34 | 34 | 36 | 34 | - |
| Bimla | 42 | 38 | 36 | 38 | 40 | 37 |

## LDL

| Name | II trimester | III trimester | IP Period | 24 hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Manorama | - | 114.6 | 123.2 | 103 | 99.6 | - |
| Mamta Jain | 114.8 | 124 | 139.2 | 113.8 | 102 | 96 |
| Parvati | - | 148 | 168 | 146 | 134.8 | - |
| Rupali Rai | 126 | - | 156 | 127.2 | 120 | - |
| Sangeeta | 183.2 | 200 | 165.2 | 165.2 | 165.2 | 146 |
| Sangeeta Jain | 114 | 132.8 | 143.2 | 136 | - | - |
| Guddi | - | 131.8 | 141 | 111 | 104.6 | 96 |
| Sudha | 116 | 128.8 | 140 | 114 | 105.6 | - |
| Kiran | - | 128.4 | 136.8 | 115 | 110.4 | - |
| Bimla | 148.8 | 169 | 172.4 | 148 | 137.6 | 126.4 |

## ECLAMPSIA GROUP "B"
## STC

| Name of pts | II trimester | III trimester | IP period | 24 hrs PP | 7th Day PP | 30th Day PP |
|---|---|---|---|---|---|---|
| Rajani | - | 222 | 230 | 210 | 200 | - |
| Guddi | - | 210 | 270 | 230 | 220 | - |
| Meena | - | 170 | 190 | 180 | - | - |
| Hemwati | - | 278 | 300 | 290 | 270 | - |
| Kashi bai | - | 250 | 266 | 221 | 230 | - |
| Gomti | - | 192 | 200 | - | 180 | 170 |
| Mala | - | - | 187 | 170 | 165 | 160 |
| Geeta | - | 200 | 210 | 170 | 160 | - |
| Raj Kumari | - | 176 | 190 | 170 | 160 | 155 |
| Susheela | - | 192 | 202 | 190 | 186 | - |
| Madhu | - | 314 | 334 | 246 | 230 | 210 |
| Pawan Kumari | - | 210 | 230 | 214 | 200 | - |
| Raj Kumari | - | 215 | 230 | 215 | 205 | - |
| Kunwar bai | - | 228 | 240 | 198 | 186 | - |
| Angoori | - | 229 | 246 | 220 | 204 | 200 |
| Jareena | - | 214 | 230 | 210 | 200 | - |
| Premwati | - | 222 | 230 | 210 | 200 | 190 |

## STG

| Name of pts | II trimester | III trimester | IP period | 24 hrs PP | 7th Day PP | 30th Day PP |
|---|---|---|---|---|---|---|
| Rajani | - | 110 | 120 | 106 | 90 | - |
| Guddi | - | 130 | 150 | 110 | 110 | - |
| Meena | - | 90 | 88 | 80 | - | - |
| Hemwati | - | 150 | 160 | 150 | 140 | - |
| Kashi bai | - | 125 | 130 | 116 | 110 | - |
| Gomti | - | 91 | 84 | - | 80 | 78 |
| Mala | - | - | 70 | 65 | 60 | 60 |
| Geeta | - | 100 | 101 | 90 | 86 | - |
| Raj Kumari | - | 86 | 90 | 80 | 76 | 155 |
| Susheela | - | 109 | 110 | 100 | 92 | - |
| Madhu | - | 160 | 170 | 192 | 130 | 110 |
| Pawan Kumari | - | 100 | 110 | 105 | 100 | - |
| Raj Kumari | - | 101 | 110 | 101 | 96 | - |
| Kunwar bai | - | 111 | 120 | 94 | 90 | - |
| Angoori | - | 106 | 112 | 100 | 98 | 98 |
| Jareena | - | 100 | 104 | 100 | 96 | - |
| Premwati | - | 116 | 120 | 115 | 112 | 105 |

## ECLAMPSIA GROUP "B"

### HDL

| Name of pts | II trimester | III trimester | IP period | 24 hrs PP | 7th Day PP | 30th Day PP |
|---|---|---|---|---|---|---|
| Rajani | - | 32 | 26 | 30 | 32 | - |
| Guddi | - | 27 | 22 | 24 | 22 | - |
| Meena | - | 27 | 24 | 27 | - | - |
| Hemwati | - | 37 | 32 | 32 | 28 | - |
| Kashi bai | - | 37 | 33 | 35 | 32 | - |
| Gomti | - | 36 | 32 | - | 34 | 32 |
| Mala | - | - | 24 | 22 | 22 | 22 |
| Geeta | - | 32 | 26 | 30 | 36 | - |
| Raj Kumari | - | 28 | 22 | 30 | 32 | 30 |
| Susheela | - | 37 | 32 | 34 | 32 | - |
| Madhu | - | 38 | 34 | 32 | 34 | 32 |
| Pawan Kumari | - | 34 | 32 | 32 | 30 | - |
| Raj Kumari | - | 34 | 30 | 34 | 30 | - |
| Kunwar bai | - | 32 | 28 | 32 | 34 | - |
| Angoori | - | 34 | 28 | 28 | 32 | 30 |
| Jareena | - | 33 | 30 | 32 | 30 | - |
| Premwati | - | 32 | 26 | 32 | 32 | 32 |

### LDL

| Name of pts | II trimester | III trimester | IP period | 24 hrs PP | 7th Day PP | 30th Day PP |
|---|---|---|---|---|---|---|
| Rajani | - | 168 | 178 | 159.8 | 150 | - |
| Guddi | - | 157 | 218 | 184 | 176 | - |
| Meena | - | 125 | 148.4 | 137 | - | - |
| Hemwati | - | 211 | 236 | 228 | 210 | - |
| Kashi bai | - | 188 | 203 | 162.8 | 176 | - |
| Gomti | - | 150.8 | 151.2 | - | 130 | 122.4 |
| Mala | - | - | 149 | 133 | 124 | 126 |
| Geeta | - | 148 | 161.2 | 122 | 107.8 | - |
| Raj Kumari | - | 131.8 | 150 | 124 | 110.8 | 109 |
| Susheela | - | 138.2 | 148 | 136 | 131.6 | - |
| Madhu | - | 244 | 266 | 185.5 | 166 | 152 |
| Pawan Kumari | - | 158 | 176 | 159 | 150 | - |
| Raj Kumari | - | 160.2 | 178 | 160.2 | 155.8 | - |
| Kunwar bai | - | 173.2 | 15 | 147.2 | 134 | - |
| Angoori | - | 173.8 | 195.6 | 170 | 152.4 | 148 |
| Jareena | - | 161 | 179 | 158 | 150.8 | - |
| Premwati | - | 164.8 | 178 | 153 | 142.6 | 129 |

# IUGR GROUP "C"

## STC

| Name | II trimester | III trimester | IP Period | 24hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Sunita | 167 | 168.4 | 174 | 172 | 170 | 175 |
| Sunita | 179 | 184 | 190 | 182 | 180 | - |
| Uma Verma | 170 | 172 | 175 | 172 | 170 | 172 |
| Geeta Tewari | - | 162 | 168 | 160 | 156 | 150 |
| Rekha | 174 | 177 | 181 | 178.2 | 175 | 180 |
| Kusum | 168 | 174 | 179 | 162 | 156 | - |
| Kaushailya | 178 | 185 | 192 | 190 | 183 | 180 |
| Nafisa | 158 | 163 | 170 | 162 | 156 | - |
| Sushma | 166 | 172 | 179 | 176 | 170 | - |
| Pista | 156 | 158 | 161 | 159 | 156 | 150 |

## STG

| Name | II trimester | III trimester | IP Period | 24hrs PP | 7th day PP | 30th day PP |
|---|---|---|---|---|---|---|
| Sunita | 85 | 92 | 98 | 95 | 95 | 96 |
| Sunita | 86 | 90 | 92 | 90 | 86 | - |
| Uma Verma | 88 | 96 | 100 | 94 | 92 | 90 |
| Geeta Tewari | - | 84 | 90 | 86 | 83 | 80 |
| Rekha | 90 | 97 | 102 | 96 | 92 | 90 |
| Kusum | 90 | 96 | 100 | 94 | 92 | - |
| Kaushailya | 98 | 104 | 110 | 106 | 102 | 100 |
| Nafisa | 82 | 88 | 92 | 90 | 89 | - |
| Sushma | 80 | 86 | 90 | 82 | 80 | - |
| Pista | 92 | 97 | 98 | 94 | 92 | 90 |